Osprey Modelling

OSPREY PUBLISHING

Painting and Finishing Techniques

Gary Edmundson

Consultant editor Robert Oehler

GARY EDMUNDSON was born in Sunderland in 1956. At the age of ten he emigrated with his family to Canada. He is currently settled in Fort Saskatchewan, working in the chemical industry as an analyser technician.
An interest in military aviation led to building military models for a hobby and Gary is now a regular contributor to military modelling magazines.

Osprey Modelling • 45

Painting and Finishing Techniques

Gary Edmundson

Consultant editor Robert Oehler

First published in Great Britain in 2010 by Osprey Publishing,
Midland House, West Way, Botley, Oxford OX2 0PH, UK
44-02 23rd St, Suite 219, Long Island City, NY 11101, USA
E-mail: info@ospreypublishing.com

© 2010 Osprey Publishing Ltd

All rights reserved. Apart from any fair dealing for the purpose of private study, research, criticism or review, as permitted under the Copyright, Designs and Patents Act, 1988, no part of this publication may be reproduced, stored in a retrieval system, or transmitted in any form or by any means, electronic, electrical, chemical, mechanical, optical, photocopying, recording or otherwise, without the prior written permission of the copyright owner. Enquiries should be addressed to the Publishers.

A CIP catalogue record for this book is available from the British Library.

ISBN: 978 1 84603 263 9
E-book ISBN: 978 1 84908 274 7

Editorial by Ilios Publishing Ltd, Oxford, UK (www.iliospublishing.com)
Page layout by Myriam Bell Design, France
Index by Fineline Editorial Services
Typeset in Stone Serif and Gill Sans
Originated by PDQ Media, Bungay, UK
Printed in China through Bookbuilders

10 11 12 13 14 10 9 8 7 6 5 4 3 2 1

Acknowledgements

This book is dedicated to my parents Bob and Shirley Edmundson, who allowed their young boys to spend all of their pocket money on models. I'd like to thank my good friend Steve van Beveren for his assistance on this book, and Marianne Yarmuch for her work and encouragement in helping me put it all together.

The Woodland Trust

Osprey Publishing are supporting the Woodland Trust, the UK's leading woodland conservation charity, by funding the dedication of trees.

Photographic credits

Unless otherwise indicated, the author took all the photographs in this work.

FOR A CATALOGUE OF ALL BOOKS PUBLISHED BY OSPREY MILITARY AND AVIATION PLEASE CONTACT:

Osprey Direct, c/o Random House Distribution Center,
400 Hahn Road, Westminster, MD 21157
Email: uscustomerservice@ospreypublishing.com

Osprey Direct, The Book Service Ltd, Distribution Centre,
Colchester Road, Frating Green, Colchester, Essex, CO7 7DW
E-mail: customerservice@ospreypublishing.com

www.ospreypublishing.com

Contents

Introduction 4
Fundamentals • Kits used

Paints and finishes 6
Types of finishes • Colour authenticity

Set-up and tools 8
Workspace • Airbrush • Paintbrushes • Masking tape • Miscellaneous

Painting and finishing model aircraft 11
Aircraft cockpits and interiors • Oil-paint wash • Engines • Canopies and clear parts
Aircraft exteriors and camouflage schemes • Priming • Pre-shading • Lower surfaces
Upper surfaces and masking • Hard-edged camouflage patterns • Soft-edged camouflage patterns
Woodgrain • Fuselage bands and other markings • Painting the details • Decals • Aircraft weathering
Flat coat • Paint chips and scratches

Painting and finishing armoured vehicles 43
Vehicle interiors • Hull and turret • AFV camouflage • Painting the details • Painting track links
Painting wheels • Markings • Weathering AFV models

Figures and presentation 73

Index 80

Introduction

Plastic model building has been around for many decades. Over time, it has evolved into an art of creating very detailed and accurate miniatures. With the advent of such accessories as photo-etched and resin parts, different types of markings and well-researched references, it has become a very involved hobby that can produce some stunning results.

Inspired by a family friend, I was introduced to the hobby at an early age. I spent most of my time and money, together with my brother Tony, building practically every model that Aurora, Airfix and Revell released. Our efforts produced some rather crude results at first, most of which met their end at the hands of my pellet gun or some well-placed fireworks. The interest in the hobby never died, and we continued to improve our building and painting techniques, buying matt-finish paints, airbrushes and other new tools as we discovered them.

In the early 1980s there were techniques introduced into the hobby's mainstream that dramatically enhanced the appearance of finished models. Publications by Francois Verlinden and Sheperd Paine showcased how simple kits could be turned into miniature works of art. Many of these detailing and finishing methods had been around for some time, for example by use of railway modellers. By applying the same procedures to aircraft and armoured vehicle kits, this sharing of techniques and ideas created some very intriguing-looking models.

Fundamentals

The idea of painting and finishing a plastic model is to replicate what the actual subject looks like in miniature. The eventual result will have the model look not like a toy, but the real subject from a distance. There are many approaches to doing this, and this book will demonstrate several options.

Overall painting guides for models are generally in the last section of the kit's instruction sheet, and provide a guide for the modeller to apply a referenced colour pattern and markings. Some instruction packages are more inclusive than others, providing detailed instructions on the colours of the various components throughout the build, and even a recommended brand name and colour number. More in-depth reference material is available in published form, usually available at specialized hobby shops or online ordering outlets. The Internet can also provide a good source of colour information on various modelling subjects. Online forums and discussion groups can provide informed answers to almost any question that deals with the painting and finishing of models, whether technical or artistic.

Paints are also used to manipulate the detail of the kit to enhance the light and shadow. The appearance of a 1/1-scale subject, a 1/32-scale subject and a 1/144-scale subject in the same lighting conditions makes it evident that more artistic work has to be done to the smaller-scale piece to get it to look like a real one. As the scale of a model gets smaller, the brighter parts of the finish need to be lighter, and the shadow areas darker.

To model aircraft and vehicles that have been subjected to fading from sunlight, streaked and rusty from dirt, oil and rain requires some extra work past the initial painting stage.

The term 'weathering' will appear often in this book as it is the key to making plastic models take on a realistic appearance. As the subject is viewed

from a distance, atmospheric contents like dust and dirt tend to tone down the look of the surface. Models need to have their finish toned down accordingly to emulate this effect.

This book is aimed at modellers who have started in the hobby and would like to improve their painting and finishing skills by investing some time and money into the necessary tools and products that are needed to do an adequate job. Although this particular title deals exclusively with the painting and finishing aspect of plastic modelling, some construction aspects will be dealt with as they apply to getting things completed in an appropriate sequence. The subject matter consists of 1/35-scale armoured vehicles and 1/48-scale aircraft, though the methods shown would apply to most common plastic model scales.

Using many of the varied techniques in this book, Eduard's 1/48-scale Albatros DVa was painted to represent the aircraft in the Smithsonian Institution, Washington, DC, at the time of its capture.

Kits used

The following assortment of models was constructed to demonstrate the painting and finishing techniques for this book. The kits were built primarily out of the box, with some minor detail enhancements.

Hasegawa 1/48 Junkers Ju87B-2 Stuka kit no. 09113
Hasegawa 1/48 Typhoon 1B kit no. 09283
Tamiya 1/48 Bristol Beaufighter TF.Mk.X kit no. 61067
Eduard 1/48 Albatros DVa Profipack kit no. 8110
DML 1/35 Sd.Kfz.234/4 Panzerspäwagen kit no. 6221
DML 1/35 El Alamein Sherman kit no. 6447
DML 1/35 T-34/76 Mod. 1941 Cast Turret kit no. 6418

Paints and finishes

Modellers have a vast array of choices when it comes to the types of paints to apply to their model kits. Lacquers offer ease of application and durability, whereas acrylics are less of a safety hazard and allow simple clean-up. What works well for some does not always do the same for others, and experience and personal preference tends to be the deciding factor in a lot of the choices the modeller makes on types of paint to use.

Types of finishes

Lacquer-based primer is typically available in aerosol cans. The benefits of using primer on a model are in helping small imperfections on the model's surface to be noticed and corrected, as well as giving a homogeneous base for the final coat of paint to firmly grip onto. Primer is particularly required when a kit has been detailed with metal parts. To allow a good measure of control in applying the primer it is advisable to decant the paint from the aerosol can into a separate container that can be used to airbrush the material on.

Lacquer and enamel hobby paints have been around for many years, and companies like Humbrol, Floquil and Testors have been supplying modellers with large selections of authentic colours. Although they give good coverage and are durable when dry, they are petroleum based and thinned with mineral spirit, turpentine or lacqer thinners. Airbrushing therefore requires a source of ventilation on account of the fire hazard produced by vaporizing this paint mixture. Spills are relatively difficult to clean up and can damage the surface of kitchen tables, countertops and flooring.

Acrylic paints have become more popular in the past couple of decades, and a significant number of companies now produce a large line of colours for modellers. Although not as durable as the enamel and lacquer paints, they are water or alcohol based, clean up with ease and are somewhat less toxic and flammable than the petroleum-based products.

It is advisable to thin paint for airbrushing using the brand developed for that product. I personally like to use the Tamiya-brand thinner with their line of acrylics so that I get optimum performance when spraying. For small brush-painting jobs and clean-up there are other alternatives. Enamel paint can be thinned successfully using low-odour paint thinner, or 'mineral spirits', purchased at a local hardware shop. Vallejo acrylics can be thinned just using tap water. Some experimentation and research is advised when using anything but the brand-name thinners. It is also recommended that once paint is thinned it should never be poured back into the original bottle to prevent contamination. If thinned paint is left over after an airbrushing session, then it should be discarded as its shelf life is short.

Artists' oil paints have a fine pigment and are handy to use in the model's finishing stages for weathering and subtle blending, shading and highlighting. Oil paints are ideal for creating lifelike effects on the faces and clothing of figurines, which are an integral part of the hobby.

Vallejo's Matte Medium was mixed with a small amount of tap water and used in the airbrush to flatten the gloss finish of the models in the book.

Clear coats of both gloss and flat finish are essential when finishing plastic models. A gloss finish is helpful for protecting paint from handling during the various stages of the painting process. It also allows a base onto which decals can be applied and oil paint washes added. Although I like to use Tamiya acrylic gloss for these types of applications, Future floor finish has also worked quite well. A good flat finish can be a challenge to achieve. Two products have worked well for me in this regard: Vallejo Matte Medium, just mixed with a touch of water, and Testors' Flat Lacquer, which produces a dead-flat finish but is a bit more toxic to work with.

Chalk pastels and pigment powders have been used by model railway enthusiasts for many years, and over time these materials have been adopted by the plastic model community. The realistic effects of dust, rust and staining commonly seen on rail stock can also be applied with dramatically realistic results to armoured fighting vehicles (AFVs), aircraft and other kits.

Colour authenticity

Achieving an accurate colour for a model has been made easier by some of the paint and kit manufacturers, who have researched their products and provided authentic hobby colours. Matches can be found for most of the required colours, although it becomes apparent after browsing the rows of paints in a well-stocked hobby shop that there is a measure of difference between various companies' interpretation of certain colours.

I have to say at this point that I am not that concerned about absolute colour accuracy when it comes to plastic modelling. Depending on the colour of an undercoat and the amount of colour intensity used on a model, it can look a completely different shade than the same paint applied on another model. How the model is weathered can also change the overall colour. I intentionally lighten a colour to give it a 'scale effect', thereby changing it further from the manufacturer's original shade. If the colour is 'close enough' and I'm satisfied with the overall look, then it is the right one for my project.

Colour reference charts and matches are posted on some model clubs' web sites. This helps those like myself who prefer to use a certain brand of paint and need to know how to mix it to acquire a shade produced by a different manufacturer. IPMS Stockholm has some extremely informative colour cross-reference charts at www.ipmsstockholm.org

The models and figures for this title were completed using a multitude of types of paints and finishes, utilizing the unique advantages of each.

Various paints used in this title include Floquil lacquer, Humbrol enamels, Tamiya and Vallejo acrylics, and Winsor and Newton Series 1 oil paints.

Pastel chalks are made into a powder by rubbing them onto coarse sandpaper. They can be transferred into a tin plate for mixing various colours and applying to the models.

Set-up and tools

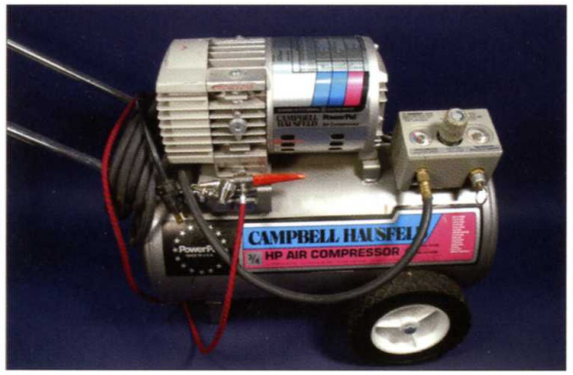
Workspace

One of the most common difficulties in painting and finishing a plastic model is having an appropriate area to do the work. Not everyone has the luxury of having a dedicated hobby room. Most of the methods described in this book involve some rather messy procedures, where the possibility of spilling solvents and other not-so-nice chemicals exists. Modelling at the kitchen table could be difficult to justify after something like that happens.

The advantages of having a segregated area to perform the tasks involved in painting a model are numerous. Besides the aforementioned, the area can be set up to have all of the necessary tools and materials at hand. The work can be set to dry for a period of time undisturbed, allowing further steps to continue easily.

Paasche's single-action airbrush, shown here with its various paint pots, was used to paint all of the models in this book.

The simple breakdown of the airbrush allows it to be easily cleaned after every use.



Air supply for the airbrush was provided by this compressor with a 32-litre (7-gallon) reservoir tank and built-in pressure regulator.

An ideal primer for providing a base for the models' finishing coats is Tamiya lacquer-based grey primer. Better control of the application can be achieved by decanting the paint into a spare jar, and spraying it on with an airbrush.

The primer can be transferred by spraying it through a drinking straw into a jar covered with plastic wrap.

When the primer has transferred over, it still contains the propellant gas that needs to be gently stirred out.

A good set of brushes is essential to achieving a proper paint job. Hobby outlets carry some of the better brands, and art shops have an even more diverse assortment of quality and price.

The work area must be fairly free of dust, hair and other foreign material. It makes it very frustrating to have a small hair adhered to the painted surface of a model since its subsequent removal can damage the finish. A dedicated hobby area can allow some control over this, and ensure that work in progress is protected from inadvertent splashes, bumps and scrapes. A small air compressor is typically used to supply the propellant for an airbrush, and these can generate a fair amount of noise that may disturb the household.

Adequate lighting is a prerequisite of a well-prepared workspace. An array of fluorescent lights above the painting area is ideal, and the light from a small table lamp can be directed into those hard-to-see spots.

Airbrush

The subjects in this book were completed using a simple single-action airbrush. The use of an airbrush to paint plastic models is essential to most of those dedicated to the hobby. Although brush painting is definitely needed along the way, painting exclusively with a brush severely limits the modeller's ability to create an authentic and attractive-looking model. Along with an airbrush comes the need for a propellant. Cans of propellant using an aerosol refrigerant gas can provide the necessary supply, or compressed air gas cylinders can be rented or purchased. The cylinders require regulators to bring the pressure down to a workable level. A small compressor with some form of pressure regulation is ideal, but is usually the most expensive tool a modeller can buy.

It is important to clean the airbrush after each use, which is a primary reason I use a single-action tool. Disassembly is fairly quick, and the preferred acrylic paints I use are easily cleaned up with Windex window cleaner.

Paintbrushes

A selection of medium-to-good quality paintbrushes is a sound investment for the plastic model builder. With the proper care and cleaning the brushes can last for many projects. A flat wide No. 4 (Tamiya No. 2) brush is good for large areas, and a 000 to 00000 brush with a fine tip is good for some of the more detailed jobs. Even when a brush has seen its better days there is always a use for it and it doesn't need to be discarded in a hurry. Old brushes are very handy for applying pastel and pigment powders, and for drybrushing colours onto the surface of the model.

Masking tape

When spraying paint there is often a need to mask off certain areas of a kit. Whether it's for a hard-edged camouflage scheme, painting coloured stripes or to close off an open interior, the use of masking tape is essential in both AFV and aircraft modelling. Tamiya markets a hobby masking tape that is ideal for this purpose. It cuts cleanly, stays where it is placed and doesn't pull off the paint when it is removed. The tape is available in various sizes.

Miscellaneous

To dispense paint when dealing with airbrush mixes, it's necessary to have some disposable eyedroppers handy. By counting the drops one can be sure of getting a fairly accurate measure. The droppers are also handy when it comes to airbrush cleaning, since a good squirt of thinner can clear the tip into a disposal jar.

Old film canisters can be put to good use as temporary containers for thinner, paint, water, cleaners and other materials that need to be close at hand while not taking up a lot of room on the workbench. It is fairly important to label each one, since dipping a paintbrush into the wrong one could spell disaster.

Tin trays are quite handy for containing pastel powder mixtures, either wet or dry. As can be seen in the pictures throughout the book, bottle caps and plastic sheet also make excellent paint palettes.

I have found Post-it notes invaluable for test-spraying an airbrush, as well as for wiping a brush before using a drybrush technique. A roll of paper towel within arm's reach allows quick clean-up from spills, painting sessions and decal application. Towels are better than paper tissue, since tissue releases a lot of small fibres that cause problems with paint finish. Long toothpicks come in handy for stirring and dispensing paint, cleaning canopy frames and mounting small parts for painting.

Some of the parts a modeller deals with are extremely tiny. Magnifiers come in many forms, and a jeweller's magnification aid 'Optivisor' is what I have used to help view my work. Various magnification levels are available for the lenses, mine being X4. Pharmaceutical shops also sell a range of magnification glasses to help the miniature hobbyist.

Old brushes should not be discarded quickly, as they make excellent tools to use for drybrushing, pastel application and other weathering techniques.

Painting and finishing model aircraft

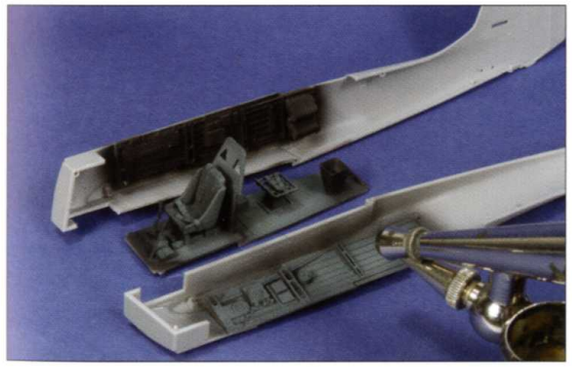
A modeller is faced with a number of options when constructing a model aircraft when it comes to the timing of the painting steps. The kit's instruction sheet will illustrate the assembly steps, but the actual sequence may vary depending on the intended paint scheme. For example, consideration should be given to a complex camouflage scheme, or a delicate area of the model that will not survive a lot of handling during the painting process.

Typically the subassemblies of the interior and cockpit are first painted and assembled and then, once they have been installed in the fuselage, the construction of the main airframe is completed. After all of the joints are sealed and sanded smooth, the exterior of the aircraft can then be finished. Smaller parts, such as antennae, landing gear legs and the canopy components, are left aside to be painted separately and added during the final steps. Each project presents its own challenges.

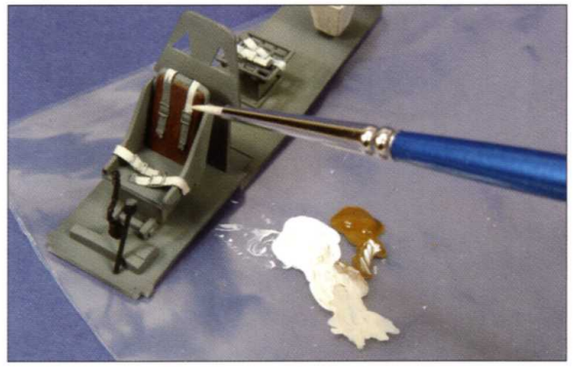
The kit's surface should be prepared by cleaning off any mould-release agent, grease or oil. It is important to handle the aircraft carefully when progressing through the various stages of painting. A small wooden handle can be used if it can be attached to an area that can be repaired or hidden when the model is completed. Occasionally a bent wire or coathanger can be used to manipulate the kit through a large enough opening. The painted surfaces of the model are best coated with a protective layer of gloss finish that helps when the model is handled during the painting and marking stages.

Aircraft cockpits and interiors

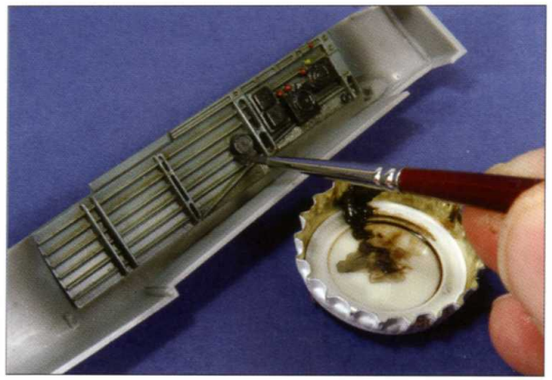
Ideally, it is best to add a priming coat to all those surfaces of the model that will be handled during the painting process. Since the fuselage and cockpit interior will see little handling, priming this area may not be necessary. Small parts can be primed and painted while still attached to the styrene runner for ease of handling. Attachment points, which are seldom apparent, can be touched up afterwards with a small dab of paint.



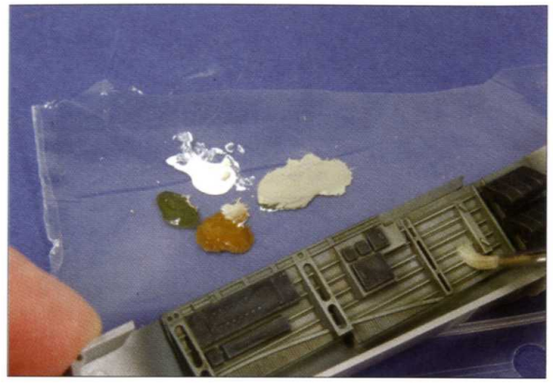
This Stuka cockpit was first pre-shaded with Tamiya's XF-1 Black, and then airbrushed with a lightened XF-22 RLM Grey. Some of the black was left visible as shadow.



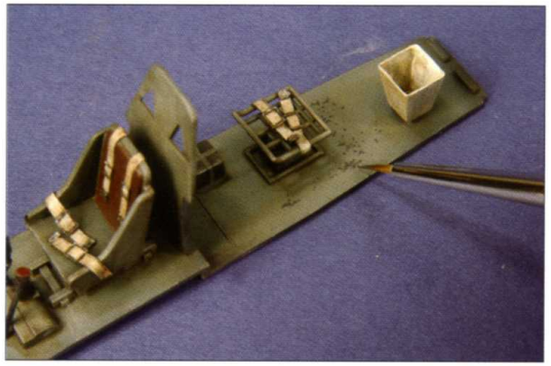
Details were picked out using small amounts of Vallejo acrylic paint. Here, the seatbelts are painted with 820 Offwhite mixed down with a small amount of 921 English Uniform.



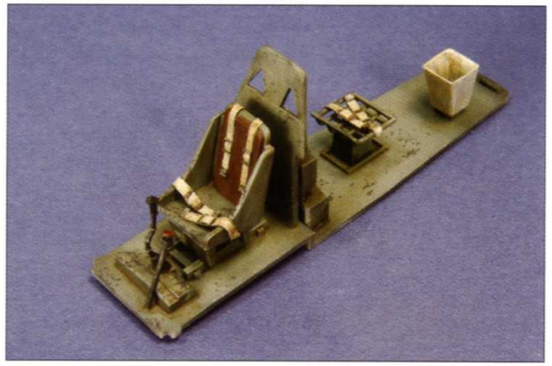
Raw umber artists' oil paint was thinned down with mineral spirits in the bottle cap, and applied to a pre-dampened side panel to give it a weathered appearance.



Vallejo acrylic paint was mixed to a lighter shade of the cockpit interior colour, and then drybrushed to highlight the detail.

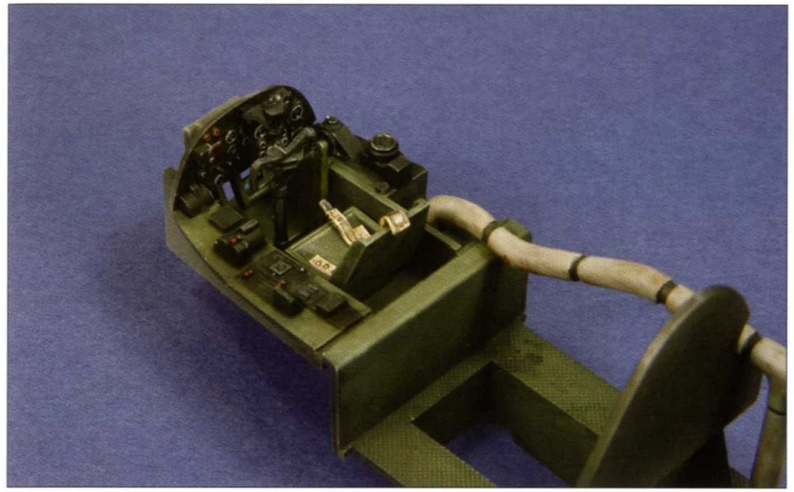


To show some wear and tear Floquil's Grimy Black, which is a very dark grey, was painted onto the high-traffic areas of the cockpit.

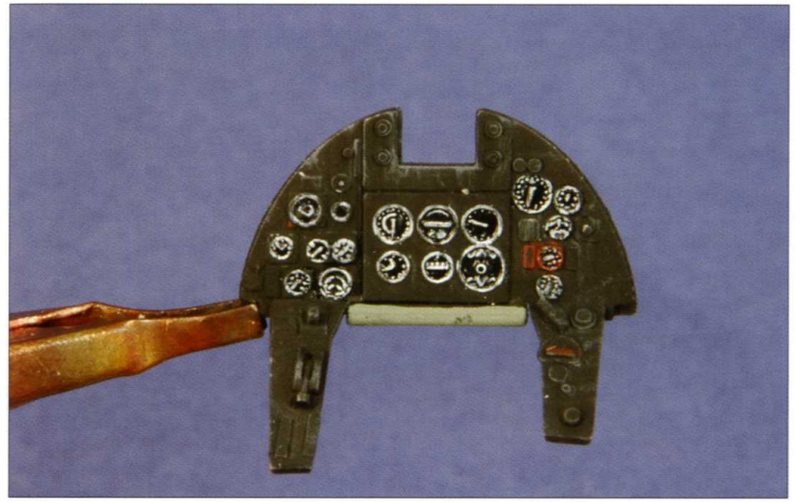


Before installation into the fuselage, the cockpit detail was highlighted by drybrushing with lighter base colours and a metalizing mixture of enamel paint.

With the fuselage and wing assembly complete, the cockpit area was masked with small pieces of Tamiya masking tape. Grey primer was airbrushed on revealing any imperfections in the surface. Putty was used to fill a blemish, and the primer retouched afterwards.



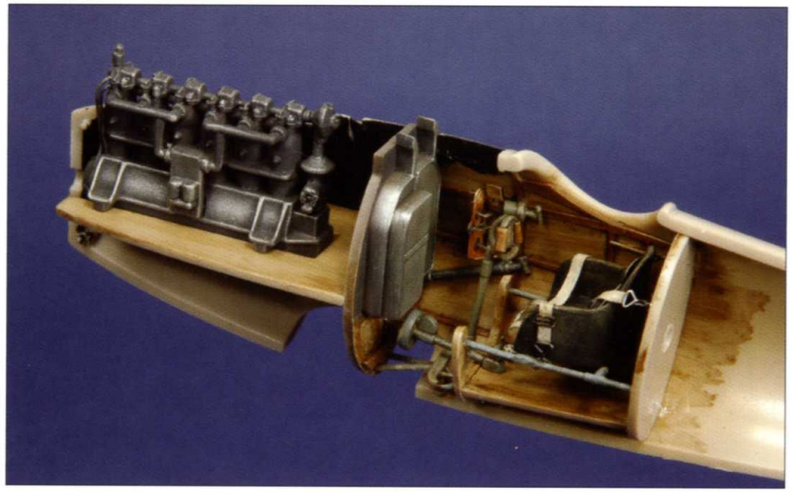
After painting the instrument panel and other cockpit details of this Beaufighter black, some of the components were picked out in various colours using Vallejo acrylics. The entire area then received a wash of black and raw umber oil paint.



The instrument panel for Hasegawa's 1/48-scale Typhoon 1B was painted using Vallejo acrylics once it had been sprayed black. Although decals for instruments are provided, the excellent raised detail on the part itself makes it easy to paint instead.

Enamel paint is ideal for drybrushing, and Humbrol 29 Dark Earth and 72 Khaki Drill were mixed to make a highlighting colour for use on the seat of Eduard's 1/48-scale Albatros DVa. The concentrated pigment from the bottom of the tin was placed into a bottle cap to mix and wipe off most from the brush before using.

The black leather seat cover was drybrushed to bring out the detail of the upholstery and give it a worn, weather-beaten look.



The cockpit and motor of the Albatros were painted and weathered with oil paints, acrylics and enamels before installation in the fuselage.

The padded leather edge for the cockpit was painted in with Vallejo 921 English Uniform and a 00 brush.

Cockpit subassembly construction should be completed with all details and then primed before painting when metal parts have been used like wire, solder photo-etched brass and sheet-lead straps.

The inside of the fuselage walls and the cockpit subassembly should first be coated with a dark base by airbrushing the surfaces black or a very dark brown. Spraying the interior colour should be done using well-thinned paint to allow the subtle shades of the dark base to remain as shadow. The Tamiya acrylic paint I typically airbrush with is thinned to about a 1:3 ratio of paint to thinner. This thinned mixture requires several passes of the airbrush to build up the coverage to an adequate amount. Patience is required not to add too much at once, which can form unmanageable puddles.

Details of the cockpit interior can be brush-painted afterwards using a fine pigment acrylic like Vallejo. I prefer to use Vallejo acrylics for several reasons. The paint, being a water-based medium, cleans up easily and is impervious to the mineral spirit-based wash that is subsequently used to weather the overall look. Vallejo paint flows well onto the surface of the details and provides good coverage with a minimum number of coats. Because of the small plastic squeeze bottle they are packaged in, a drop or two can be dispensed onto a palette for small jobs with minimum waste.

Kit manufacturers occasionally provide decals for the aircraft's instrument panel. Using the decal for aircraft of 1/72 scale or smaller works well, but for the larger aircraft there are other options. The panels are typically moulded with the instruments in relief, with each dial and indicator having a raised lip around it. Rather than try and place the decal onto this raised panel, it is easier to paint the panel black and drybrush the detail already embossed onto the surface. With a small paintbrush (size 000 or smaller), the marks in the dials can be painted in and covered with a glaze finish when dry. Glazes like Tamiya gloss acrylic, Future floor polish, or Microscale's Kristal Klear can be used for this.

Cockpit throttles and other control handles have certain colours that are not always flagged in the instruction sheet. If colour references from books are not available, the Internet can be a good source of this type of detailing information. Adding some touches of white, red, yellow and green to highlight a cockpit area adds some dimension and life to the model. The bright colours of the details should be 'toned down' slightly using a small amount of earth brown added to the particular colour before it is applied.

Seat belts can be painted in an off-white colour, with the buckles and other metal parts picked out in a darker grey. I create an off-white by mixing white with a small amount of earth brown Vallejo acrylic called English Uniform 921

Paint must be removed from the points of gluing on the kit parts. Some of the very volatile glues such as Tamiya's Extra Thin Cement will wick into any kind of paint and destroy it.

Oil-paint wash

Painting on a thinned mixture of artist's oil paints can enhance the surface detail of the kit. The oil paints give an 'antique' finish to the surfaces they're applied to. The fine pigment of oil paints allows it to darken the kit's recesses and articulate detail in a subtle or stark way depending on how much paint is used. The highest grade of oil paint is the preferred material to use, and since only a small amount does the job, the cost of it is justified. My recommendations are raw umber and black from the Winsor and Newton range. To thin the paint, I use a generic brand of low-odour paint thinner (otherwise known as mineral spirits) and not turpentine. Turpentine is quite harsh and can damage paint finish and also attack plastic joints.

After all of the detail has been completed, a wash of artists' oil paint is added to the inside of the fuselage walls, cockpit subassemblies and other interior components. Adding this fine pigment to the details is best accomplished over a surface painted with acrylics since the solvent won't attack the paint. It will

damage enamels, which would need a protective clear acrylic coat if used beforehand. Raw umber oil paint is a very dark brown and adds a shadow effect to enhance detail; it also gives the subject a dirty, used look.

To create the wash, a small amount of the oil paint is taken from the tube and wiped onto a scrap of polyethylene film. Mineral spirit thinner can then be used on a small brush to mix a small amount of the oil paint into a thinner consistency. After dampening the painted surface of the model with some clean thinner, the thinned oil paint can be dabbed into the corners and other details of the interior. A clean, dry brush can be used to help control the amount of liquid and amount of colour by wiping the excess away. A glossy surface will retain its original colour more than a matt surface, which will absorb some of the oil paint and take on a darker appearance.

Once the wash has dried, drybrushing can further enhance various details in the interior. Worn metal surfaces can be emulated by taking silver enamel and mixing it with a touch of raw umber oil paint. By using an older 000 brush, the paint mixture can be wiped onto a paper towel or notepad until all that remains is a trace of colour. The brush is then rubbed delicately onto the surface of the detail giving it a subtle sheen. If the effect is too harsh, more oil paint can be added to subdue the effect. The detail of the aircraft interior colour can also be drybrushed by adding a lighter tone of it to a brush and repeating the process previously mentioned. Enamels tend to give the best results when drybrushing.

As a final touch, scuffs and scrapes to the paintwork can be emulated by adding small random spots of dark grey or dark brown paint to the areas that may realistically see some wear and tear. In the case of chipped aluminium, the marks would be done using toned-down silver enamel. The paint chipping can be applied with a very small paintbrush, size 000 or smaller, and kept to a minimum, since it's easy to get carried away. The work should be put aside on a frequent basis, and revisited to assess the progress of this method of weathering.

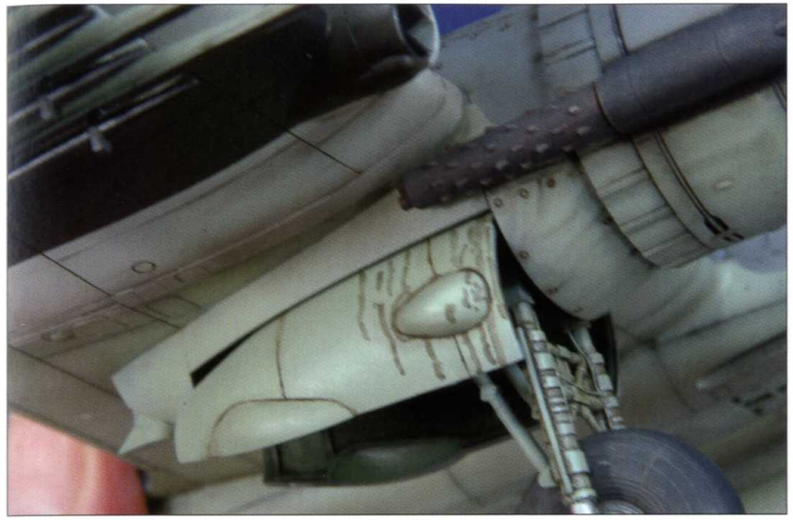
Engines

Before the fuselage or airframe can be glued together, the engine, if visible, has to be painted. After all detail has been added, the engine assembly can be sprayed a brownish black or dark grey colour, despite what the final colour will end up being. Adding a small amount of brown to straight black paint gives it a more 'scaled' look. Wiring and other components can be drybrushed in a lighter grey and, if the engine body is a different colour, that shade can be drybrushed onto the surface. Cooling fins of an air-cooled engine can be picked out using a worn-metal drybrushing technique as described earlier, along with bolt and rivet detail. As a final touch, a dark brown chalk pastel powder can be scrubbed onto a piece of coarse sandpaper and transferred onto an old size 000 brush. The pastel powder is then rubbed onto the engine to impart a weathered, dusty look indicative of heavy use.

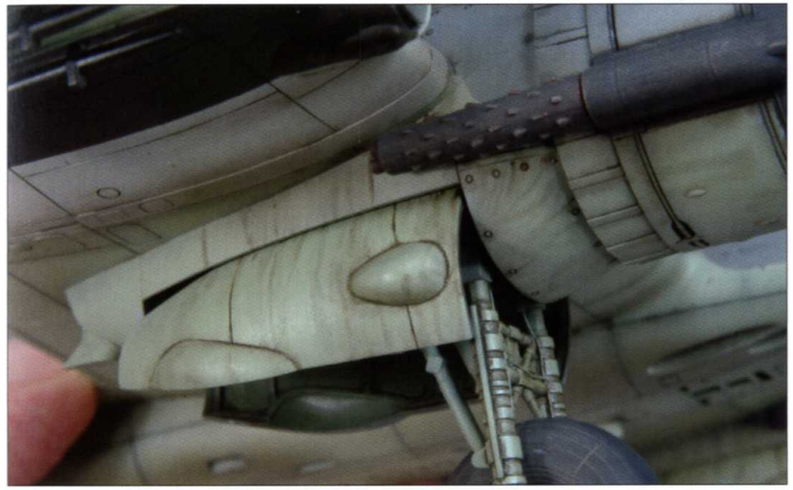
The engines of the Beaufighter were airbrushed black. The cylinders were drybrushed using silver enamel toned down with a small amount of raw umber oil paint. The exhaust piping received an additional drybrushing of gold enamel, again toned down with the raw umber. A small amount of brown pastel dust was brushed into place giving a dusty, weathered look.

The engine exhaust and associated piping is typically coloured a dusty burnished metal. Exhaust pipes are drybrushed lightly with the silver enamel/raw umber oil paint mixture mentioned previously, and also a gold enamel/raw umber oil paint mix to add an element of variation to the colour. I have also added a small amount of dark brown pastel chalk powder as a final touch, giving the exhaust piping a very dusty flat look.

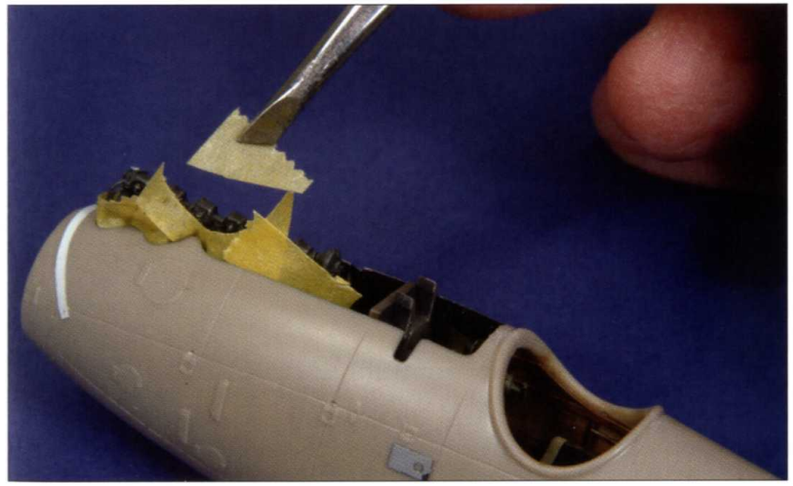
The engine firewall, if visible, could benefit from adding some small stains using raw umber and black oil paint, along with the same coloured pastel chalk application.



Aircraft engines left a large amount of oil and other fluid stains on their lower surfaces. A heavily loaded brush of thinned black oil paint was run over the model's surfaces to show dark streaks in this area.



A wide, clean brush dampened with thinner was used to blend the streaks.



The engine of the Albatros was masked using small chunks of tape cloistered together. Using scraps from a previous masking exercise is practical and economical.

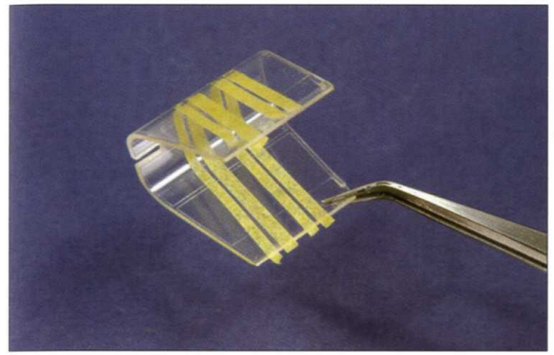
The exhaust pipe of the Albatros was painted in Floquil Grimy Black, then drybrushed with silver and gold enamels that had been mixed with raw umber oil paint.

The exhaust pipe received a dusting of dark brown pastel dust to complete the weathering, giving it a dusty, charred appearance.

Canopies and clear parts

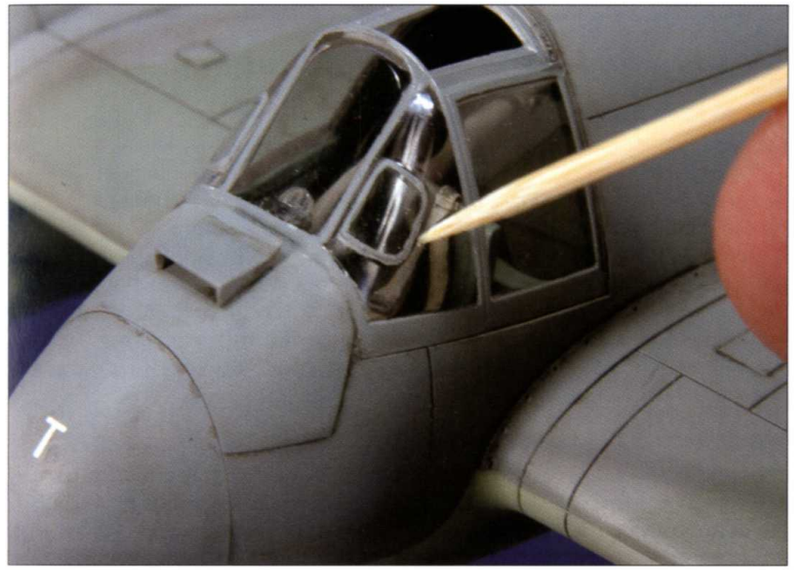
One of the decisions a modeller must make during the assembly of a kit is whether to glue the canopy on before or after the body of the aircraft is painted. The advantage of leaving it off until the final stages of completion is that it won't risk damage from handling, and there won't be any surprises when the masking tape is removed at the end. Where a smooth joint is needed between the body of the aircraft and the canopy it may have to be attached, joints sealed and then masked and painted along with the rest of the exterior of the aircraft. Canopy fit in recently produced kits is generally good, allowing them to be painted separately and added to the model during final assembly.

For the interior colour to show on the inside of the canopy frame, the canopy should have its exterior glass panels masked with strips of Tamiya masking tape. The exposed canopy frame should then be airbrushed with the interior colour on the outside. After this has cured, the exterior colour should then be applied over the frame. This allows the interior colour to show through the clear part from the inside.



The canopy of the Stuka featured inside frames that were masked with thinly cut strips of the Tamiya tape. These lines were airbrushed with Tamiya XF-22 RLM Grey.

An arduous task: the canopy sections were all masked inside and out, and then painted the base colour of the aircraft.

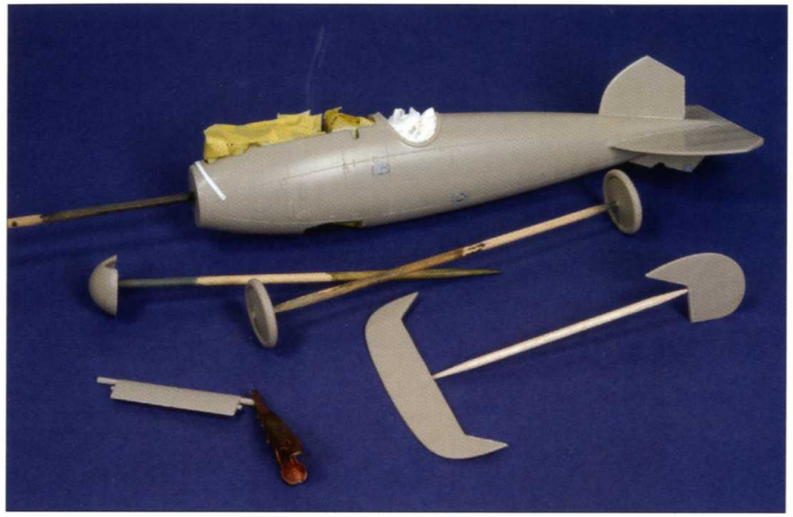


Painted canopy frame lines can be cleaned up by taking a toothpick dampened with Windex window cleaner. The cleaner works to loosen and remove excess Tamiya acrylic paint, leaving a clean, smooth line.

A fine pair of tweezers helps remove masks from the canopy. Care must be used to avoid scratching the surface during the process.

In the event of masking tape leak, acrylic paint can be removed from the canopy with a brush dampened with Windex window cleaner.

To assist the painting process, some of the smaller parts can be mounted on toothpicks for ease of handling. Copper clips used for soldering also make handy holders. In this case the cockpit was masked by pushing in a wet paper tissue.



Aircraft exteriors and camouflage schemes

After the important steps of construction of the main fuselage, tail assembly and wings have been completed the model needs to have all seams filled, with all the joints sanded smooth. In the case of a biplane most of the exterior paintwork is carried out before the wings are attached to the main assembly.

To protect any exposed work that has been previously painted, like engines and cockpit detail, masking tape can be carefully added in small overlapping pieces. A wet tissue can also be carefully stuffed into place to fill an awkward area. The tissue can cause trouble during removal if it has dried out, so it's a good idea to remove it after each painting session and re-apply when necessary.

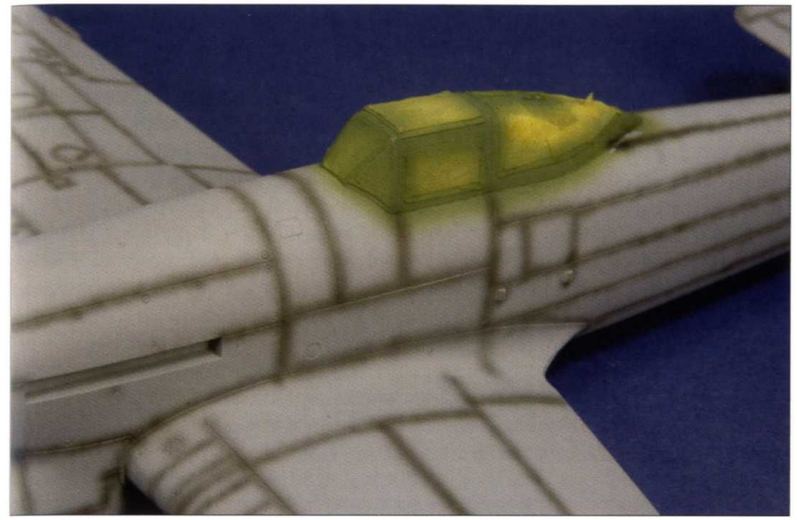
Priming

The aircraft kits featured in this title were all sprayed with Tamiya Grey primer. Applying this material straight out of the aerosol can is a tricky job, since control of the amount dispensed is poor and too much can ruin the surface of the model. For better control, the paint should be decanted from the can and sprayed with an airbrush. The paint was decanted by spraying it through a drinking straw into a small jar covered with cling film. It is a messy undertaking with fumes and spatter that needs cleaning with a damp cloth at the end. The resulting liquid in the jar will also hold some of the propellant gas, which needs to be bubbled-off with a delicate stir using a toothpick. Any quick agitation could possibly result in a foaming, lacquer-based volcanic eruption.

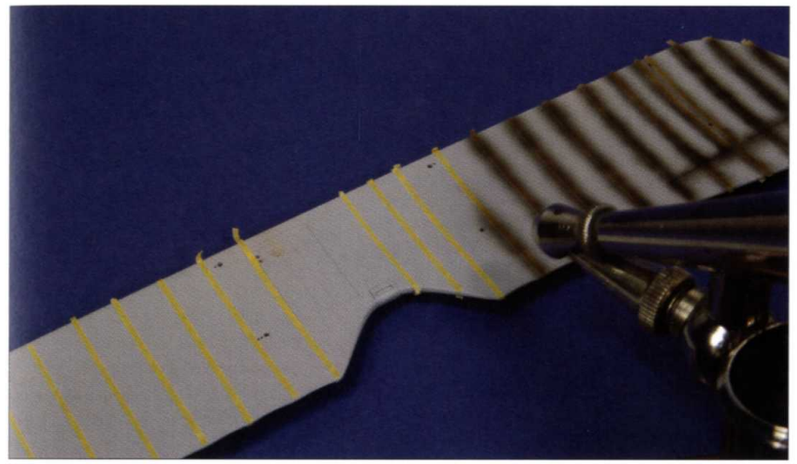
Once the model has been given several light coats of primer it can be studied under good lighting to see if any imperfections still exist on its surface. Should any further filling or sanding be needed, this can be carried out and the primer coat reapplied to the area. Since this type of primer dries in a short time in warm temperatures, the painting process can continue soon after an hour or so.

Pre-shading

Although not an essential step, the model can be pre-shaded at this point. The idea of pre-shading a model aircraft is to accentuate some of the detail and recesses of the kit, thus beginning the weathering process. It also helps to break the monotony of a colour scheme, adding some modulation to the overall look when the final colour is applied over it.



Before painting the Typhoon's canopy the exterior colour, the frame was initially painted in the interior colour of chromate green, allowing it to show through.

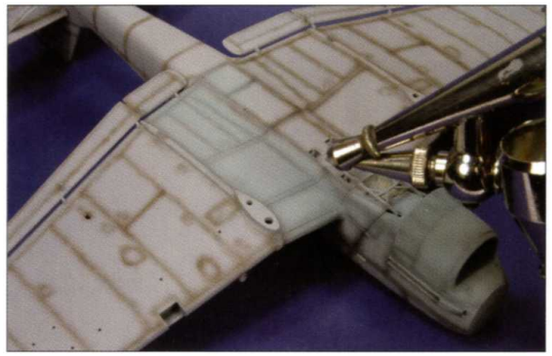


To give a pre-shadow to the Albatros wing ribs, thin strips of mask were applied to each rib and sprayed over with a dark line.

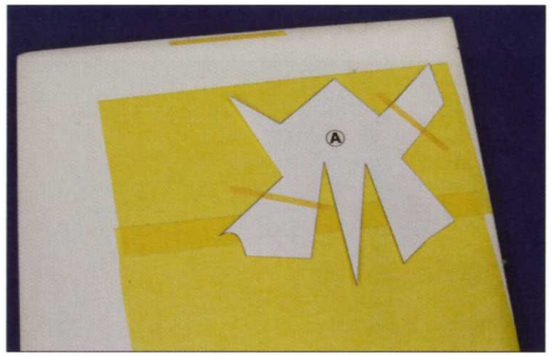
Showing the lower wing, the bottom was sprayed with a light blue after removing the tape strips. A 1:4:2 mix of the three Tamiya colours as displayed was thinned and airbrushed on, leaving a trace of the shadow to show through.

Using an airbrush set to spray a fine line, dark paint (black or very dark brown) is applied to all of the joints, seams, wing roots and panel lines of the aircraft. This requires a heavily thinned paint mixture of about 1:8, and a lot of patience with the airbrush. The effect is certainly noticeable on lighter colours, such as the underside of an aircraft, though it has less effect when the colour scheme is rather dark, or a multi-layered camouflage scheme has been applied over it. Some thought should be given to how much effort is required to paint in all the lines, when they will be covered over later with a finish that all but eliminates the effect.

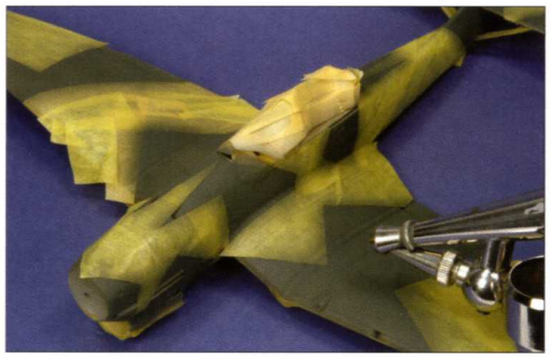
The rib pattern on fabric-covered flying surfaces can also be enhanced by pre-shading. After priming the model's surfaces with a light grey lacquer, the rib lines on the wings and tail of the Albatros DVa were masked with a 1mm-thin line of Tamiya masking tape sliced from a thicker roll on a ceramic tile. A thin line of dark brown Tamiya acrylic was then sprayed over the line of tape, with the paint allowed to cover both sides of the taped lines. The tape was then removed after all the lines had been painted, revealing a highlight that would show through the eventual finishing coat of paint.



After spraying on fine dark lines to pre-shade the Stuka's panel lines, a coat of light blue was airbrushed on the underside. Tamiya XF-23 Light Blue was added to thinner in a 1:5 ratio. The underside was then protected with a clear gloss airbrushing of Future floor polish, and masked in preparation for the upper camouflage scheme.



The kit provided patterns for the splinter-type camouflage on the upper side. They were copied, cut out and placed on overlapped sections of 40mm-wide Tamiya masking tape.



The masks were set into place on the kit after an initial RLM 71 Olive Green airbrushing with Tamiya's XF-61 Dark Green. RLM 70 was airbrushed on using XF-27 Black Green.

Tamiya XF-59 Desert Yellow was thinned considerably and the air supply cranked to 35psi to obtain a fine line of airbrush spray. The desert scheme was studied from photos, and a pattern laid down on top of the two-tone green. The finish was sealed with a coat of Future floor polish afterwards.

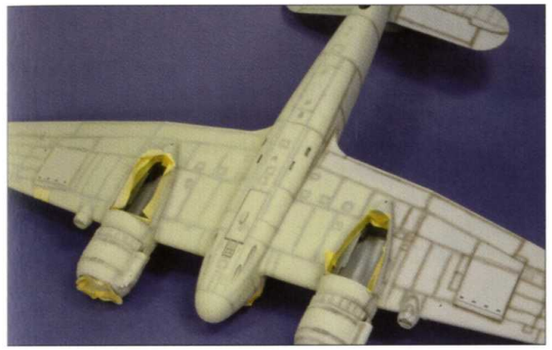
Lower surfaces

The normal process of painting model aircraft exteriors is to go from the lighter colour first, which is typically the underside, and then progress to the darker finish on top. With the scheme and colour picked out, the lower surfaces of the model can be sprayed using a fairly thin mixture of paint. To get the most from the pre-shading effect, the colour should be applied in several passes, misted on and monitored for effect.

Since the underside colour will eventually be masked to allow the upper colours to be applied, it needs to be added well past its demarcation line to ensure proper coverage. After the underside colour has been completed, it should be sealed with a coat of clear gloss.

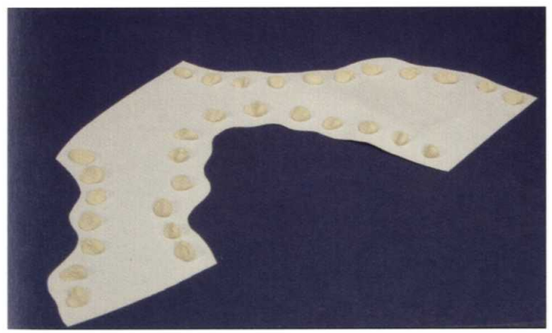
Upper surfaces and masking

Before commencing the paintwork on the upper surfaces, the paint finish on the lower side should be masked along lines indicated on references. The edges of a roll of masking tape are typically not as sharp and clean as necessary for masking a model. A length of tape should be placed on a smooth, flat, clean surface such as a ceramic or glass tile. Using a steel ruler, the edge of the tape can be removed with a sharp No. 11 hobby blade. This provides a straight, clean edge for areas

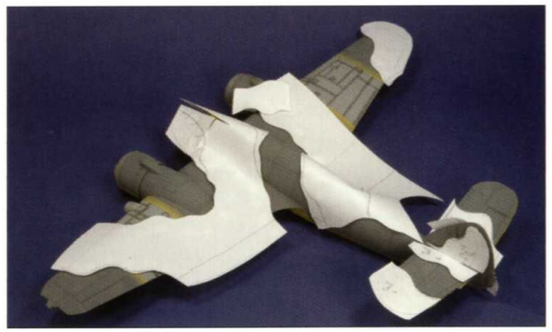


A thinned coat of Tamiya XF-21 Sky was airbrushed over the pre-shaded panel lines on the underside of Tamiya's Beaufighter.

To prepare for the upper surface base colour of Tamiya XF-54 Dark Sea Grey, the leading edges and aft fuselage section were masked off. Some of the curved sections of masking tape were cut using a sharp No. 11 blade on a ceramic tile.



Paper masks for the camouflage painting were held in place using a temporary adhesive putty called Holdit.



The Tamiya XF-54 Dark Sea Grey base coat was protected with a coat of Future floor polish. The small adhesive balls of putty held the masks approximately 3mm from the model's surface. Tamiya XF-22 RLM Grey was airbrushed on at a 90-degree angle to the masks. XF-22 is close to the dark slate grey used by the RAF's Coastal Command.

such as the leading edge of a wing. More complex curved masks can be made by placing a thick section of Tamiya tape onto a ceramic tile and carving the appropriate shape out after marking it out on the surface. A single thin line of tape can be made to follow shallow curves if necessary, with the subsequent areas masked with a build-up of smaller pieces of tape.

Once the masking process has been completed, the upper surface colour can be applied. If pre-shading has been done, the paint application process is a slow, controlled effort using a well-diluted paint mix so that the effect can be monitored.

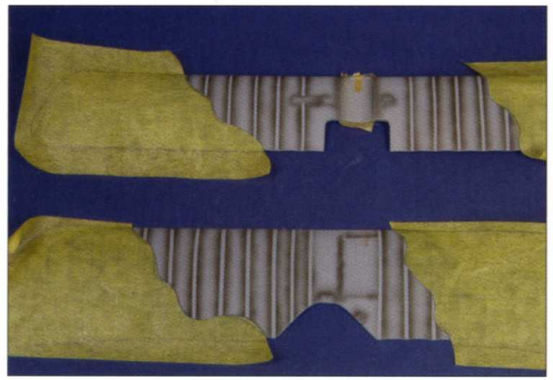
Since wet paint can occasionally 'wick' under masking tape, it's advisable to apply the coat sparingly, almost allowing it to dry on contact rather than forming puddle areas. Holding the model at an angle to see light reflected on the painted surface allows monitoring of the application. Removing the tape soon after paint application can prevent a small dried paint 'lip' forming at the masking tape's edge. The nature of the painting process on an aircraft model unfortunately doesn't often make this a practical option.

Because handling a model is inevitable during the painting process, a coat of clear finish should be applied to each stage of the paintwork. I typically hold an aircraft near the wing root at the leading and trailing edges, so this area receives a liberal amount of the protective gloss coat.

Hard-edged camouflage patterns

To apply a hard-edged camouflage pattern to an aircraft, the modeller can either paint it with a brush or use a pre-cut mask over the base colour. To brush-paint a model convincingly requires a few applications of paint with a technique that minimizes the inevitable streaks that may mar the finish. The preferred method is to use an airbrush after masking the pattern.

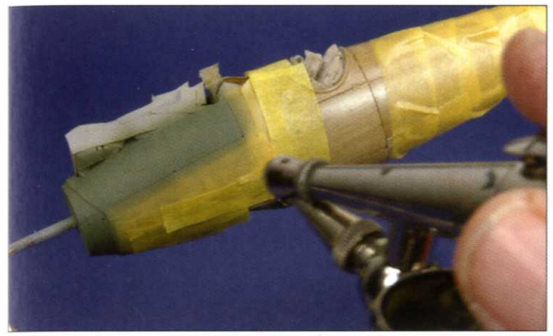
Tamiya masking tape comes in a larger 40mm size that is ideal for masking areas on the wing of 1/48-scale and smaller models. If a larger size is needed, the tape can be overlapped and cut to fit. I start by positioning the tape on a flat surface from which it can be easily peeled. By placing the wing, for instance, over the surface of the tape, a rough outline can be pencilled in. The pattern can be outlined, sections of tape cut with a sharp hobby blade and then placed into position on the model. For larger areas of pattern that reach across the fuselage and further, smaller sections of tape can be used to join the larger ones to form a continuous line.



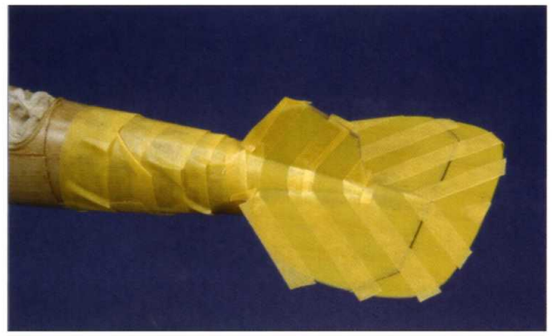
To allow the pre-shading to show through the upper camouflage scheme on Eduard's Albatros, it was masked twice with larger sections of the 40mm tape.

Tamiya's XF-61 Dark Green and X-16 Purple were toned down with Buff for scale effect and airbrushed onto the top wing after the masks were swapped, with clear gloss being sprayed on as a protective coat in between. This gave the hard edge to the camouflage scheme, and kept the pre-shading lines consistent underneath.

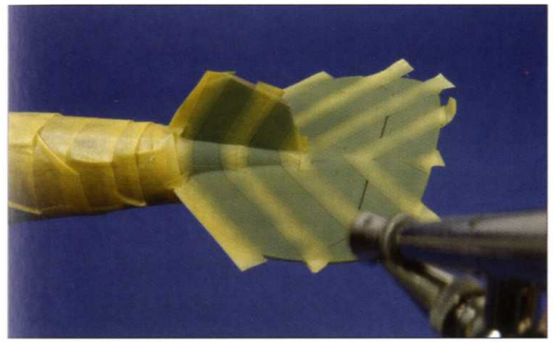
The demarcation edges of camouflage on World War II British aircraft tended to be in between hard- and soft-edged. To achieve this look, a pattern is cut from paper and suspended over the surface of the model by about 5mm. Small balls of Blu-Tack can be used to hold the paper. The paint is sprayed at a 90-degree angle to the paper, and a subtle demarcation line results. The paint consistency and distance of the airbrush tip from the paper mask are all factors affecting the eventual painted edge.



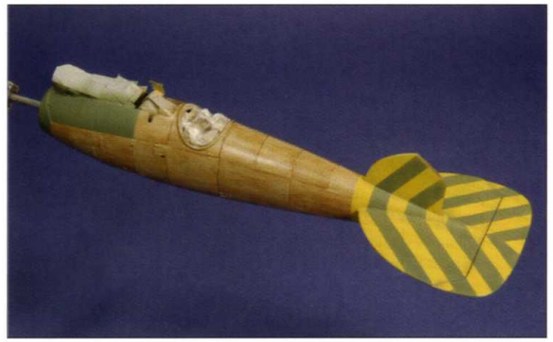
Eduard's Albatros kit provided masking sections for the nose colour, but the Tamiya tape was used because of familiarity and success rate.



The tail section was airbrushed in an off-yellow, mixing Tamiya XF-3 Flat Yellow with a few drops of XF-57 Buff. Rather than use the kit-provided decals for the green stripes, the laborious task of masking was undertaken.



A 'scale' green was mixed from Tamiya XF-61 Dark Green and XF-57 Buff and airbrushed onto the tail.



Because the paint for the tail section was scaled down using Tamiya XF-57 Buff the colours don't jump out brightly as would the decaled representation. Decals would also have been difficult to line up and trim on the edges of the tail surfaces.

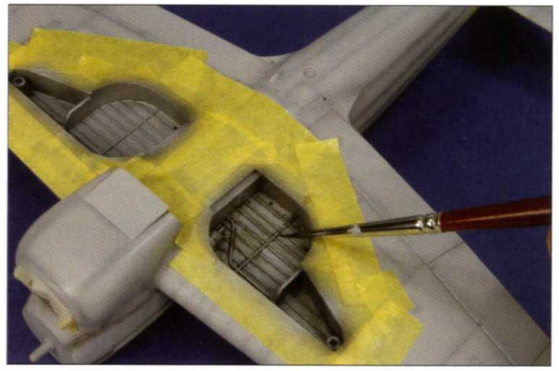
Small drops of various Vallejo acrylics were combined on a plastic sheet to match the green colour used on the nose of the aircraft. This was used to paint the fittings and access hatches on the fuselage.

Soft-edged camouflage patterns

To apply a soft-edged camouflage scheme to a model, the airbrushing can be done freehand. The edge of the pattern can be painted on with the airbrush set to spray a fine demarcation line. This is done by using relatively thin paint, approximately a 1:8 ratio of paint to thinner, with the supply pressure set to about 35psi. When painting in the bulk of the colour behind the demarcation border, the spray pattern of the airbrush can be widened and the paint consistency can be thickened.

Since the airbrush can block up after a while with congealed paint the tip needs to be occasionally dabbed free of the accumulation with a brush soaked in thinner. Frequent test-shots of spray need to be spotted on a scrap of paper to ensure the flow of paint is consistent. This is especially important when spraying the very fine lines of a 'squiggle-pattern' type of finish seen typically on World War II German aircraft in winter.

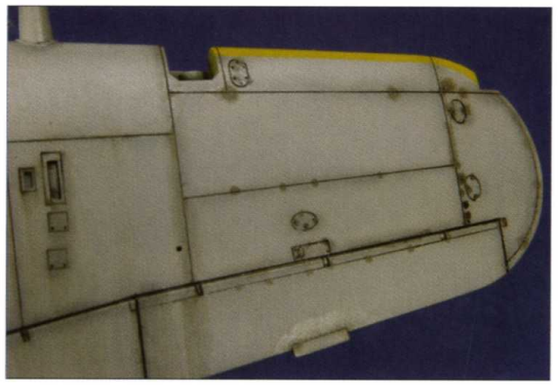
There's nothing worse than getting a spatter of paint leaving the tip of the airbrush and forming a spider-like mark on an intricate pattern. To avoid this involves a bit of experience with the tool, and a feel for what kind of conditions



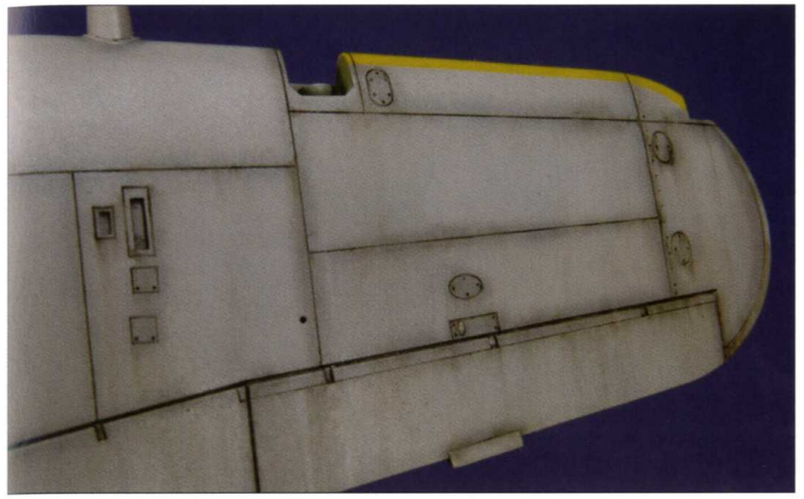
The landing gear bays on Hasegawa's Typhoon were painted with silver enamel over a pre-shade of Tamiya XF-1 Black. The enamel was used out of desperation as no acrylic was on hand at the time. To protect the enamel from a mineral spirit and oil paint wash, it was heavily airbrushed with a coat of Future acrylic.

The underside of the Typhoon was airbrushed Tamiya XF-25 Light Sea Grey, and the upper surface base colour was XF-54 Dark Sea Grey. After applying paper masks similar to the Beaufighter model, the dark green camouflage was airbrushed on using XF-65 Field Grey.

Removing the masks revealed a fair bit of residue from the putty adhesive. This was removed using a piece of the putty itself, pressing it onto the marks repeatedly until they disappeared.



The panel lines of the model were enhanced by adding a thinned amount of raw umber and black oil paint to the detail. As the loaded brush is touched to the surface it wicks itself around the recesses. The amount that the paint flows depends on how thinly it's diluted and how much is on the brush.



A clean, dampened brush was used to clean up the spot marks and blend the overall look. By drawing the brush in the direction of the airflow it gives an appropriate streaked look.

make it occur. Paint that is too thick, or has had a chance to form a build-up, or possibly a long pause between spray bursts can all cause this type of problem. To recover the paint scheme from this dilemma means repainting the affected area with the base colour, and respraying the pattern.

Woodgrain

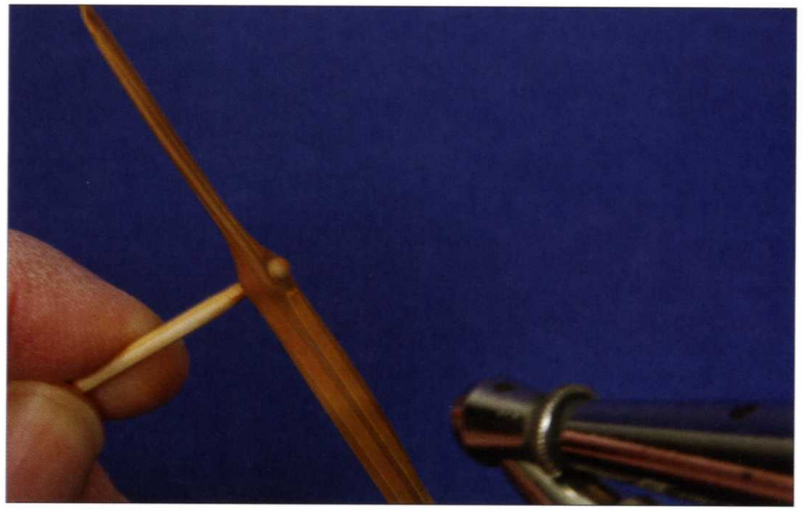
Fuselages on several types of World War I German aircraft consisted of clear, varnished wood, along with the propellers and some other features. The finishes were sometimes dark stained or had a blonde, natural look. Eduard's 1/48-scale Albatros DVa featured in this title was used as an example of painting a woodgrain finish.

There are a number of decal manufacturers that produce a thin film marking in the form of woodgrain that can be applied to a light brown painted finish. For the Albatros model, I painted it using a streaked oil paint effect. The fuselage was first primed with Tamiya light grey lacquer and then given a coat of XF-57 Buff. This was then clear-coated using Tamiya X-22 Clear gloss coat. A thinned mixture of raw umber and burnt sienna oil paint was used to create a streaked effect

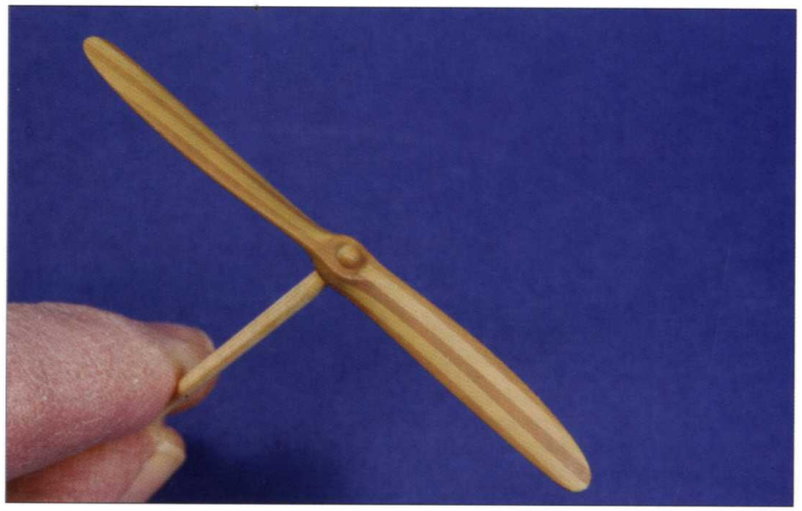
Painting the woodgrain pattern was tested first on scrap plastic. After glossing over Tamiya XF-57 Buff, thinned oil paint was mixed and streaked onto the surface producing a woodgrain effect for the fuselage of the Albatros.

The fuselage was painted Tamiya XF-57 Buff and gloss coated using Tamiya's X-22 Clear. Every second section of the wooden panelling was masked and the thinned oil paint smeared into place, keeping consistency with the thinner ratio and using a plastic sheet as a palette. After each section had dried, it was clear coated and the process continued.

After painting the propeller Tamiya XF-57 Buff, it was masked with thin strips of tape on both sides.



Tamiya XF-64 Red Brown was mixed into Tamiya XF-57 Buff and then sprayed onto the propeller blades.



Removing the tape revealed a laminated wood look. The propeller then received a woodgrain effect of a gloss coat followed with oil paint streaks.

on the glossy surface using the right amount of paint/thinner ratio, and an old stubby brush that created the streaks of colour. Mineral spirits were used to thin the oil paint. A certain amount of experimentation took place with the paint colour, thickness and how to streak it using a piece of styrene card prepared with the Buff and Clear acrylic base.

After masking every second wood panel on the fuselage, the various areas were coated with the woodgrain effect, and allowed to dry thoroughly before being protected with a gloss coat and masked over so the remaining panels could be done.

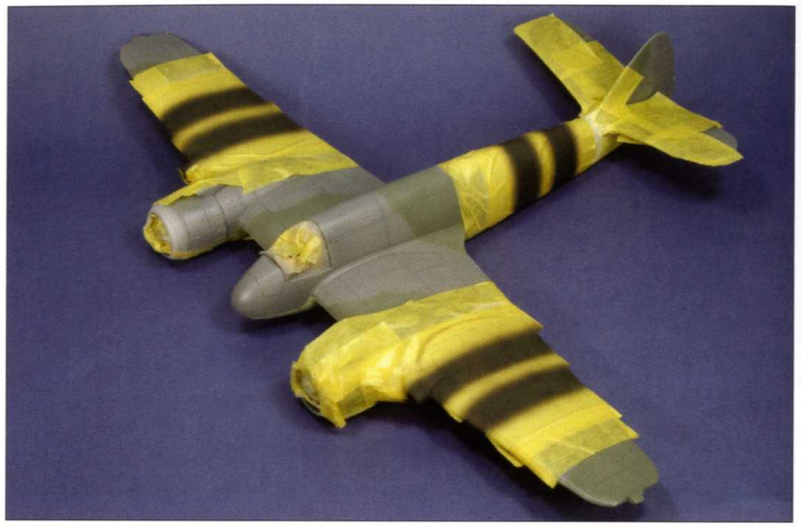
The Albatros's cockpit interior was also handled the same way, with the various components of the firewall, bulkheads and cockpit floor receiving this woodgrain finishing technique.

Fuselage bands and other markings

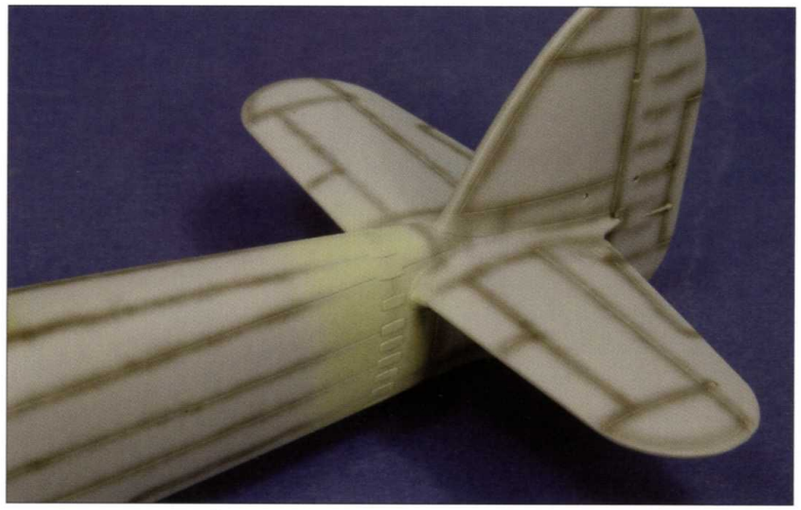
Quite often aircraft featured large bands of colour on their fuselage and wings. Most model kits that have this type of marking are supplied with an appropriate waterslide decal. Since the contours of the model and surface detail tend to make decal application difficult, it is often easier to paint on these types of markings.

Sections of off-white were painted onto the wings and fuselage in preparation for making invasion stripes. XF-57 Buff was added to XF-2 White to tone it down sufficiently.

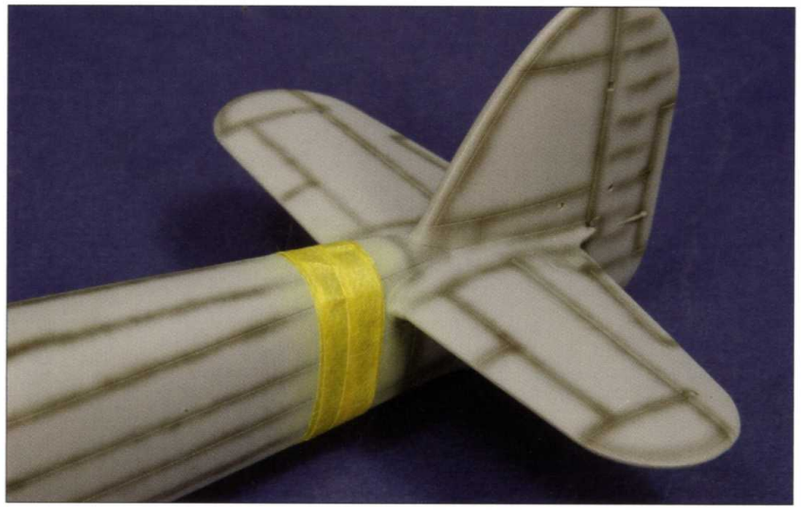
Strips of tape were cut to mask off the white part of the invasion stripes.



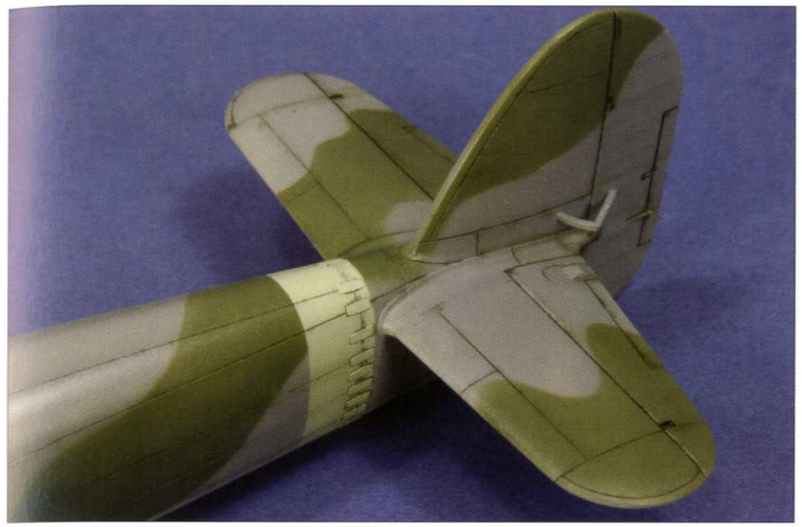
Tamiya XF-1 Black, with a small amount of XF-57 Buff and XF-64 Red Brown added, was airbrushed in place. By toning down the black and white paint, the invasion stripes appear less vivid.



Rather than use the fuselage band provided in the Typhoon kit decals, it was airbrushed on using Tamiya XF-21 Sky.



The band was masked using strips of tape thin enough to follow the contours, and filled in with subsequent scraps.



After the rest of the upper and lower surface camouflage was completed, the tape was removed to reveal the band.

Painting a light colour over a darker surface can be difficult because of the darker colour showing through. The sky-coloured band on the 1/48-scale Hasegawa Hawker Typhoon's fuselage was first painted onto the light grey primer. The band was masked off and the tape kept in place while the upper and lower camouflage scheme was applied. Removing the mask afterwards revealed a uniform band of colour with no loss of detail, and straight lines.

Thick black and white recognition bands, known as invasion stripes, were painted onto Allied aircraft around the time of the 1944 Normandy invasion and subsequent fighting in North-west Europe. Sections of the 1/48-scale Tamiya Beaufighter's wings and fuselage were masked and airbrushed an off-white colour using Tamiya XF-2 White with a bit of XF-57 Buff added to tone it down. To ensure the proper size of the black stripes, the decals supplied with the kit were used to provide measurements. Pencil marks were made on the surface to indicate the location for the masking tape strips to be laid in place, and the bands were airbrushed using Tamiya XF-1 Black with a few drops of XF-64 Red Brown added to the mix. After the tape was removed the invasion stripes were protected with a clear coat of Future floor finish.

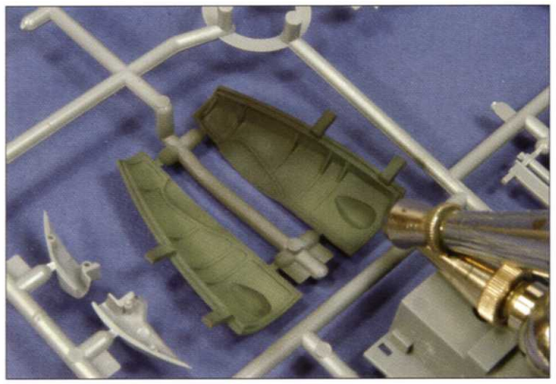
Painting the details

Many of the smaller details added to the model in later stages can be painted while still attached to the sprue, or held separately with tweezers or spring clips. Painting wheels and landing gear legs and other details that are silver can be accomplished by giving them an initial dark base coat and then drybrushing the colour onto them. Once the colour has been created by mixing silver enamel with a small amount of raw umber oil paint with an old size 00 brush, it can be drybrushed onto the part that has been primed in either a dark grey or brown. Any recessed areas will remain in a shadow, which can be controlled by how much colour is applied. A protective acrylic gloss coat would have to be added if any mineral spirit-based oil-paint washes were spread on top of this.

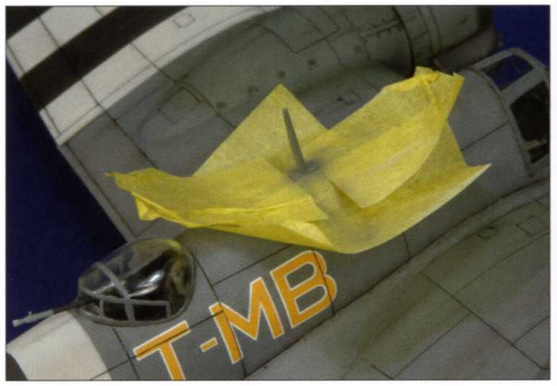
Aircraft tyres should be painted a dark grey using Floquil's Grimy Black. To give a dirty effect, a light brown chalk pastel can be applied in a powdered form, and rubbed onto the tyre with an old paintbrush. To remove some of the dust from where the tyre would meet the ground the powder can be smeared away with a finger, leaving most of the deposit on the sides. This effect can also be emulated by drybrushing the tyre with light brown enamel paint, concentrating on its sides.

The tip of the Stuka's propeller spinner was painted by masking the rear colour with a very thin strip of tape, allowing it to follow the contour of the line. The remainder was covered using scraps of tape from that previously used on the model.

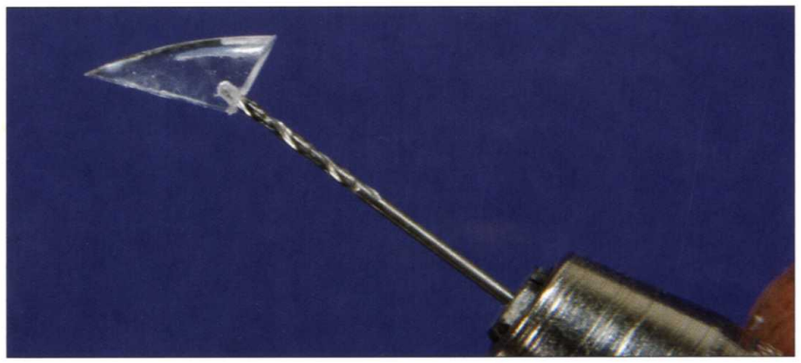
Some of the smaller and more delicate parts of the model had to be painted, finished and added after the main part of the paint job had been completed, since handling would possibly damage them in the process.



Some parts can be left on the plastic runner for ease of handling when painting. The landing gear doors for Tamiya's Bristol Beaufighter received the interior green colour by airbrushing on a mix of equal parts of Tamiya XF-5 Green, XF-21 Sky and XF-65 Field Grey.



Small items added after the main paintwork has been completed can be finished later. By using a small spray area when using the airbrush, only the immediate area needs to be masked off.



To paint landing lights, a small hole should be drilled in the glass part and filled with the appropriate colour paint.

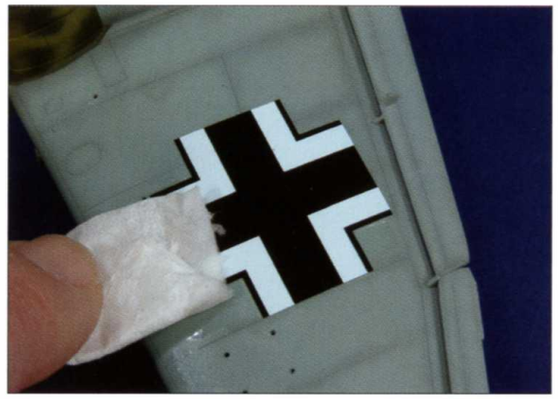
Decals

One of the most nerve-racking steps when building a model airplane is applying the decals. Whether using the kit-supplied markings or something bought from an aftermarket supplier, the modeller usually gets one try at getting this step right or faces a disaster! Decals in older kits could sometimes fall apart after soaking, and often came with a thick film that was difficult to hide after application. Decals produced recently are printed on a thinner, more transparent film that allows for better handling and conforming to the surface.

Decals can be placed on a model before or after weathering processes. Oil paint washes may harm decal film, so the markings may have to be placed afterwards and weathered separately. A small amount of straight raw umber oil paint can be worked onto a decal with a paintbrush to mute the colour and blend it into the overall weathered finish of the model.

The model should have a clear gloss coat applied where the decals are to be placed. This helps eliminate trapped air under the decal film that produces an effect called 'silvering', which is unsightly and difficult to correct. After dipping the decal into a small pan of lukewarm water, it should be placed for a few

To apply the waterslide decals, the individual markings were dipped in warm water and then allowed to soak on the workbench. AeroMaster's decal sheet 48-279 was used for the Stuka.



The marking is laid into place on the gloss surface of the kit with the help of a few drops of water. A dampened paper towel helps to press out the bubbles and excess water.

Solvaset decal setting solution was liberally applied to the decal surface. This solution penetrates the film and allows it to settle into the surface detail. It also causes the film to become so fragile that it can be damaged easily, so caution is needed when using it.

Disaster can strike when using Solvaset with decals. This marking was applied with the middle of the roundel slightly off centre and had to be carefully scraped off and replaced.

The decals were added to the model during the subassembly stages and sealed with acrylic gloss coat for protection during handling. Small chunks of the upper wing crosses were still ripped off in the assembly process when the masking tape was removed, and had to be touched up with Vallejo 950 Black.

moments on a clean surface to allow the moisture to penetrate the paper backing. If the decal is left to sit in the pan of water, it can leave the paper backing on its own accord and possibly suffer damage when it is 'fished' out. When the decal has loosened from the backing, it should be slid onto a predampened location on the model, and then positioned carefully using a finger, tweezers or (using extreme care!) a hobby blade. By gently pressing the decal down onto the model with a dampened paper towel, trapped air and water is forced to the sides. Decal setting solutions such as Solvaset can now be dabbed onto the surface, allowing the decal to soften and settle into the recesses and other details of the kit. After the application of Solvaset, the film becomes quite delicate and any attempt to move it will result in damage. The decal must be in its absolute final position before this liquid is applied. After initially shrivelling to a very worrisome wrinkled look, the decal will eventually flatten out and conform to the finest detail beneath it, but it takes a few hours to cure fully. It is always a good practice to airbrush on a clear gloss over the decals when cured.

Aircraft weathering

Aircraft in military service can get exceptionally dirty, and nothing looks more authentic than a heavily weathered model aircraft. Studying photos of the subject matter can help a modeller determine what kind of weathering to apply to their model, and where to put it. Some weathering techniques can be more artistic license than fact, but a little exaggeration in these techniques can make an appealing-looking model.

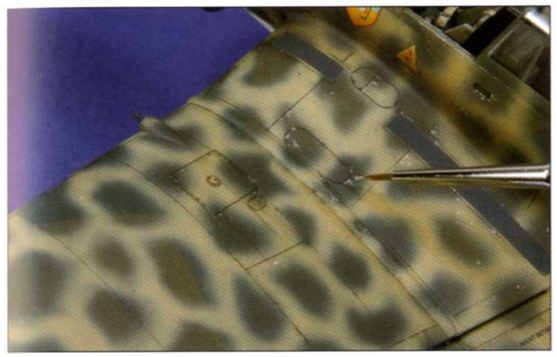
The weathering process for a model has begun if pre-shading has been carried out. After all of the paintwork has been sealed with a gloss clear coat, the panel lines and other recesses can be treated to a wash of dark oil paint. I like to use black and raw umber, mixed in various proportions and thinned with mineral spirits. By adding just the right amount of oil paint to thinner and loading a 000 brush, the mixture can be 'touched' to the individual panel lines and details, allowing the dark fluid to wick along the length of the line. Varying the paint to thinner ratio will determine how much the panel lines will be accentuated. Small spots may appear where the brush has touched on the outside of the detail, but these can be swept away by a second brush dampened with clean thinner after allowing the wash to dry for a few minutes. When

wiping the thinner aside, it's important to smear it in the direction of the airflow over the aircraft, thus adding a second effect of staining.

Straight oil paint can be used to give tonal effects to the model's overall colour. Spots of brown or white can be dotted strategically onto a grey surface and slowly blended into the paintwork to create subtle fading and smearing effects. Variations in colour can be created using elemental colours with the finish, such as yellow spots on a green surface, white on grey, etc.

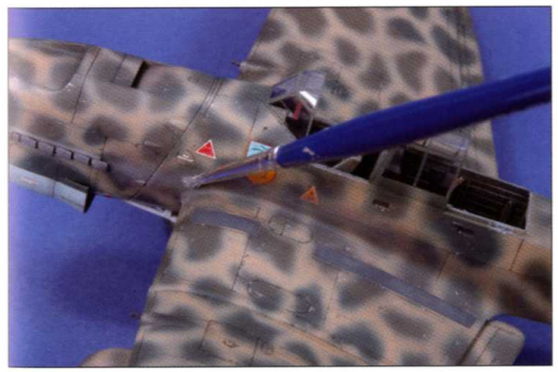
The underbelly of an aircraft usually suffers the worst staining. Oil and other fluids from the engine leak backwards down the body as gravity and airflow push them against the surface, along with any filth kicked up from the ground. Thinned black oil paint should be concentrated around the underneath of the engine area to add streaks and stains commonly seen on the real thing. Straight dark oil paint (not thinned) can also be applied to panel edges of the model and pulled back with a paintbrush or finger to show the streaked effect of fluid leaks on the aircraft surfaces.

Exhaust stains on the side of an aircraft tend to look like feathered brown swathes with a touch of light brown scorching on top. Depending on how the aircraft's engine has been running, the stains can vary from hardly noticeable to large and soot-like. To airbrush on an exhaust stain, photos of the actual aircraft should be studied to see how the airflow has patterned the mark on that particular type. To airbrush on the stain, an extremely thinned mixture of



Small paint chips were painted onto the Stuka to give it a battered look. The chips were randomly dotted onto areas that would be scraped during typical service and maintenance.

Chalk pastel colours were combined on sandpaper to create a light tan colour.

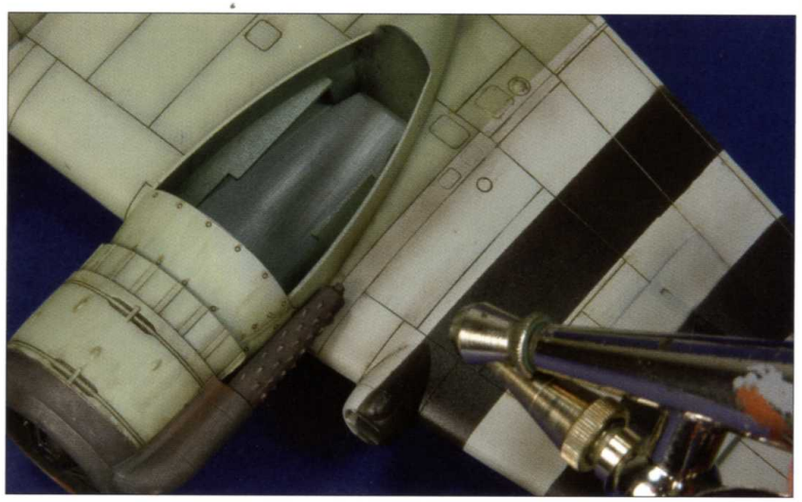


After a feathered line to emulate the exhaust stain was airbrushed on, the pastel dust was applied to the middle of it to show the residue evident on the real aircraft.

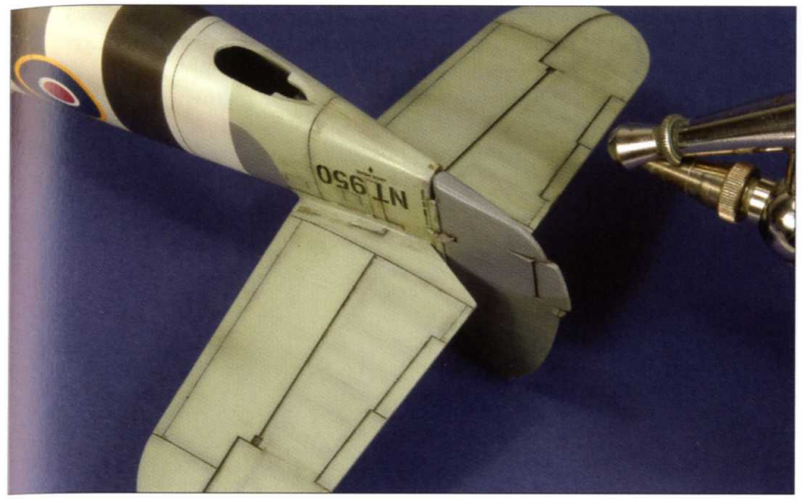
The colour of the marking was modified using Vallejo acrylic paint after researching the aircraft depicted in wartime photographs.

The wheels of the Stuka were glued into place after construction. The tyre was painted with Floquil Grimy Black and then brushed with earth-coloured pastel dust, which was then mostly rubbed off.

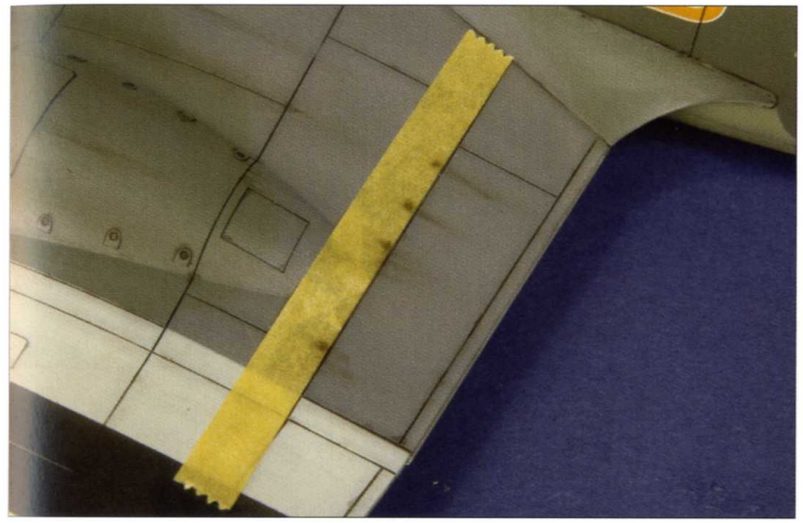
The canopy sections were glued in place using Microscale's Kristal Klear. The camouflage colour was then airbrushed on to match the adjacent pattern before the mask was removed.



The exhaust stain on the Beaufighter was airbrushed in place using a highly diluted mixture of black and brown acrylic. The effect should appear subtle, so control of the intensity and pattern is important.



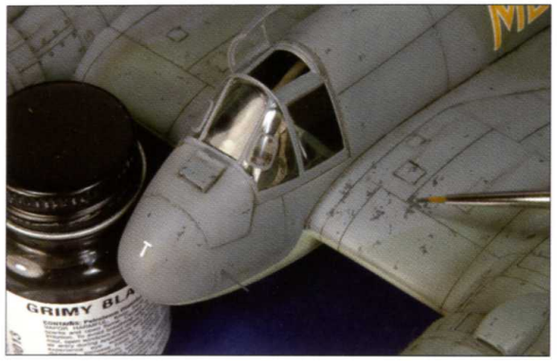
In addition to exhaust stains, dark brown streaks were added to various areas to show other weathering effects from severe service.



To show streaking and stains from under panel lines, the front panel can be masked off and small amounts of raw umber or black oil paint added to the edge. The paint is then streaked in the backward direction of the airflow.

The tape is removed to reveal the stains as if they had leaked from below the forward panel.

black/dark brown paint in approximately a 1:12 ratio should be used, and carefully feathered into place, concentrating on the rear of the exhaust ports and gradually fanning backwards. When this has been completed and dried, a very small amount of light-coloured chalk pastel or pigment powder can be gently brushed over the middle of the dark brown stain to obtain a subtle 'frosting' of the area. Contemporary photos of warbirds taken at air shows reveal this, especially on some US Navy aircraft like Corsairs and Hellcats.



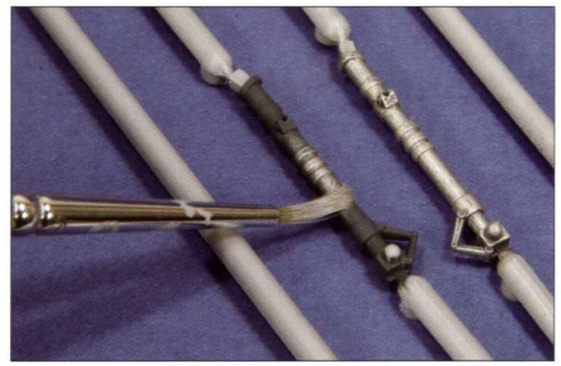
Scratches and scuff marks to the paintwork were shown by painting on random spots using Floquil's Grimy Black with a 000 brush. The spots were concentrated in the areas of high traffic, and on the leading edges of the wings.

The exhaust and accumulator piping was painted in a dark grey and then lightly drybrushed using silver and gold enamels mixed with raw umber oil paint. Even though the instructions have these as copper, photos of the actual aircraft show these to be very dark in colour.

Panel and control surface lines were enhanced by painting dark-coloured oil paint onto the glossy surface and wiping off the excess in the direction of airflow.

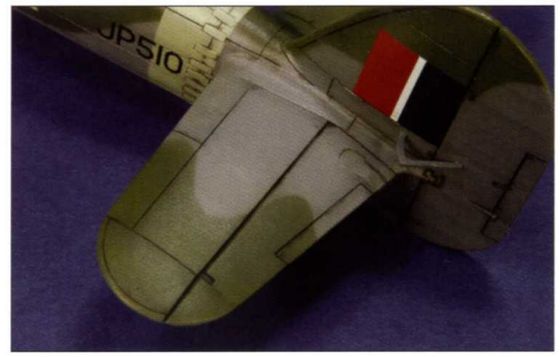
The model received a flat finish using Vallejo's Matte Medium, mixed with tap water.

Near the end of the finishing process of the Typhoon the walkways were masked off and sprayed with the off-black mixture.



To paint smaller items silver, the parts were airbrushed in Floquil Grimy Black and then drybrushed with a silver enamel/raw umber oil paint mix.

Interesting tonal variation can be achieved by adding some small spots of artist's oil paint to the model's surface. Some white and yellow Winsor and Newton oils were dabbed on the tail of the Typhoon.



After working in the oil paint with a clean wide brush, a mottled effect is seen in the grey and green camouflage finish.

Flat coat

After most of the finishing has been carried out on the model, a coat of flat or semi-gloss finish can be applied to the surface. Since I prefer a dead-flat finish, Vallejo's Matte Medium thinned with some tap water works well for me. How much the finish has been thinned and how much is applied controls the final look of this finishing coat. The medium also hides most of the decal film on the model, giving a homogeneous overall appearance to the aircraft's surface.

Paint chips and scratches

As a final touch, adding a few marks on the aircraft model to indicate scratches and other damage to the paintwork can add a realistic and dramatic look, and articulate some of the detail present.

Paint can be chipped away from where panels have been removed on the gun covers and engine cowlings, and especially the access to the cockpit area. Painting small spots of paint in a random, well-placed fashion can emulate evidence of personnel working around these areas.

When showing this effect on darker paintwork, small marks of silver enamel toned down with raw umber oil paint should be dotted into place. The dots should be jagged looking, and fall mainly along edges and corners, as if the action of the airflow took some of the flaking paint with it. The leading edges of the wings would also take a beating from the elements and show evidence of paint chipping.

On a lighter-coloured finish, dark grey or brown paint can be used to good effect. Using a 000 brush or smaller, the small dots of paint can be mixed from Vallejo 950 Black and 921 English Uniform with a touch of 820 Offwhite to take down the contrast if necessary. The work should be monitored carefully as this technique is easy to overdo. Consistency and restraint are thoughts to keep in mind when applying this weathering method.

Holes were drilled into the tail and mast, and invisible thread was glued into place to form the radio antenna. A blob of Kristal Klear was built up and painted off-white for the insulator.

Paint chips were added to the various edges of the aircraft's panel lines and access hatches. The walkway was also weathered with dirt-coloured chalk pastel.

After all of the decals had been placed, the model received a flat coat of Vallejo's Matte Medium.

Thinned dark brown acrylic was airbrushed onto the model to give exhaust stains and, after adding some black paint to the mix, to mark up the wings by the cannon positions.

Small paint chips were added to the metal sections of the Albatros. A spent-cartridge chute was made from thick solder wire and left in its metal finish.

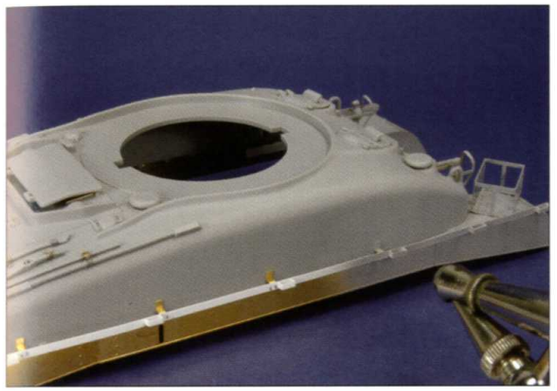
With model biplanes, the construction sequence dictates that the painting and weathering process is carried out on subassemblies beforehand. With rigging and wing assembly carried out later, the final stages involve some repainting and small touch-ups.

Small touches of thinned oil paint were used to give a weathered effect to the control surfaces.

Painting and finishing armoured vehicles

The process of painting armoured vehicle kits follows a similar method to the previous chapter on model aircraft. Armoured vehicles tend to get considerably more beaten and dirty in appearance, and painting and finishing them can present some wonderful opportunities to experiment with weathering techniques.

During the early stages of model construction, the modeller must determine what steps to take to navigate the painting process. Since the instruction sheet guides what is necessary to complete the model, the modeller must determine what subassemblies need to be painted at what stage, especially if an interior



To homogenize the surface of AFV models in preparation for painting, they were airbrushed with Tamiya grey primer decanted from the aerosol can.

To help handle the model during the painting process, a hole was made in the bottom and this wooden handle screwed in place. The file handle has a wood screw epoxied into it.

The home-made handle was inserted into the bottom of the model to ease handling of the model during painting and weathering. The priming step was skipped on this model, which was a mistake since paint flaked off the aluminium gun barrel.

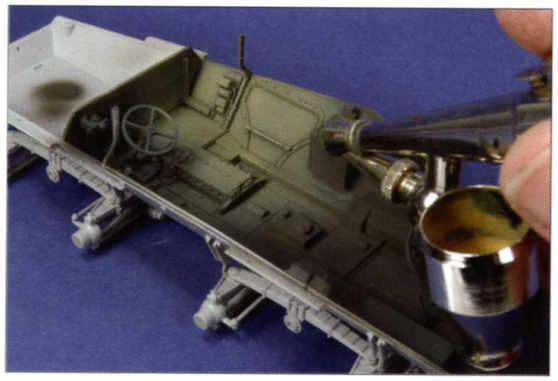
is involved. With some vehicles the lower hull, tracks and running gear are painted before construction of the hull is completed. The Russian T-34/76 in this book was painted in two separate sections for example (upper and lower) that were joined just before the final weathering stages.

Handling an AFV model during painting is a bit easier than working with aircraft, since a small hole can be drilled in the bottom of the kit and a wooden handle screwed in place. The blemish it creates won't be a concern with most projects since it is easy to fix when the model is completed.

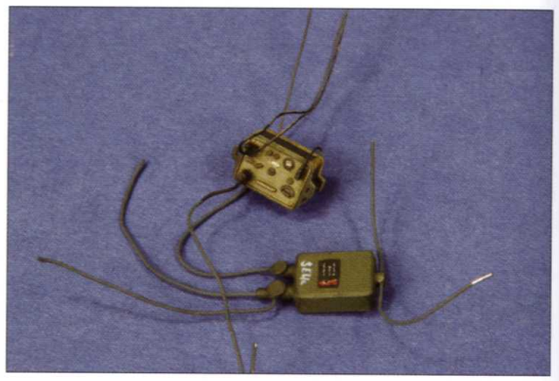
Priming an AFV model is a good start, especially if the kit has some etched-metal parts and a turned metal barrel. Tamiya's lacquer-based grey primer was used to give a firm base for the paint to adhere. Following the priming coat, a black/brown mixture of Tamiya acrylic was applied to the entire model to create a pre-shade for the subsequent finish. It is very important to make sure that the model receives this dark base into every nook and cranny.

Vehicle interiors

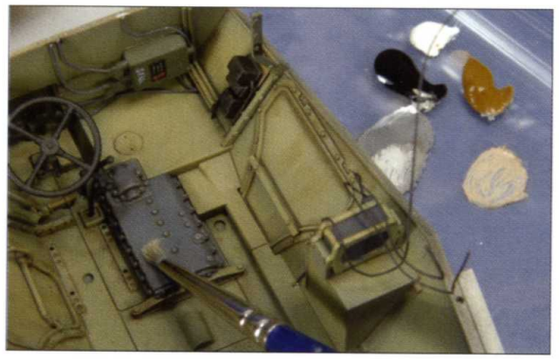
For an AFV model with a detailed interior, the subassemblies need to be painted and installed before the rest of the kit is put together. Priming the surface beforehand is optional since there is little to no handling of the parts once they are painted. The vehicle interior should be assembled and then airbrushed in a black or dark brown colour. Some of the more complex items from the interior can be left to be finished separately, like the radio system and associated wiring, ammunition and personal equipment.



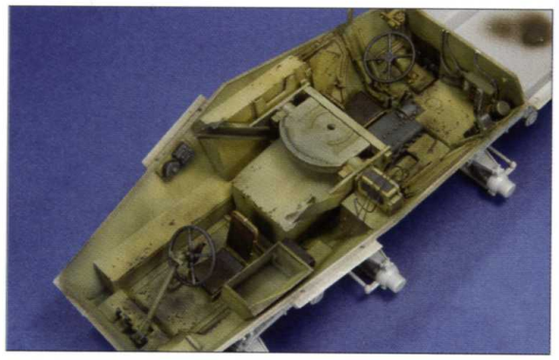
Painting a vehicle interior involves the same methods as used on the exterior. After most of the subassembly is constructed, it should be basecoated in a dark pre-shade followed by airbrushing with a dilute mix of the final colour.



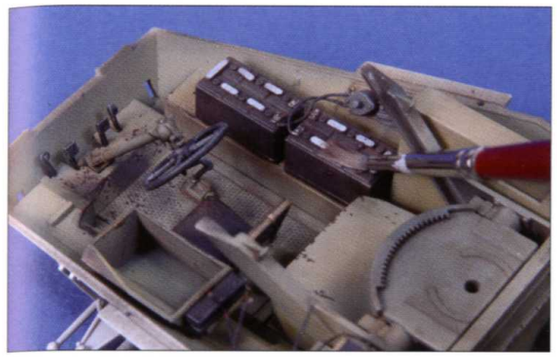
Some of the more involved details such as the radio and power supply are best left separate, and added later in the construction.



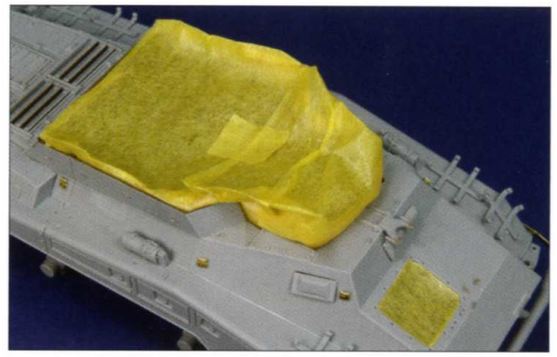
After a wash of oil paints, some of the interior features can be highlighted by drybrushing them with a lighter mix of the individual base colours.



Scrapes and scuff marks were added to the components using a mix of dark Vallejo acrylics and a fine-pointed 000 brush.



Aftermarket additions like these batteries were weathered with oil paints and given a dusting with brown pastel chalks.



Large scraps of Tamiya's masking tape were used to protect the interior prior to beginning the exterior paint job.

The overall interior colour should be airbrushed on, allowing the dark pre-shade colour to remain in the corners and under the detail of the various components. The interior parts can then be painted using Vallejo acrylics, and weathered afterwards.

If small stencilling in the interior is to be applied using decals, the area where the decal is to be placed should be coated with gloss acrylic. This allows for the decal to adhere to the surface with none of the bubbles that cause 'silvering'. A matt finish can be sprayed over this afterwards. To emulate stencilling or information placards without using commercially available decals, small random dots can be painted as characters using thinned Vallejo acrylic and a 000 brush or smaller. The trick is to keep the dots somewhat consistent in size, and in a straight line.

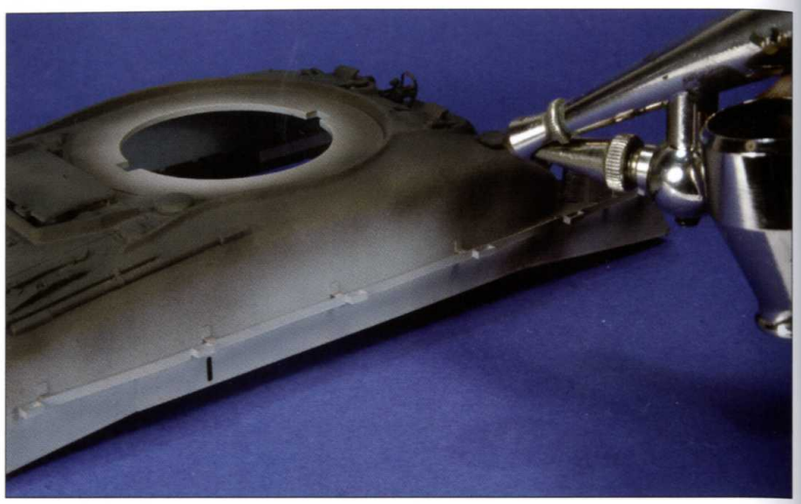
Hull and turret

If the wheels and tracks of the AFV can be removed from the assembly for painting, then the model can be completely constructed before painting commences. Details like the rubber tyres, worn metal parts and track links are best weathered separately and then reattached when the kit is in its final stages of finishing.

After being primed and receiving a dark pre-shade coat, the lower hull should be painted with the base colour of the model itself. By thinning the acrylic colour to a 1:5 ratio of paint to thinner it can be added gradually, allowing the dark base to remain as a shadow. An alternative method that helps with the weathering stage is to paint the lower hull and running gear in a ground colour and drybrush on the vehicle's base colour afterwards. AFVs get incredibly filthy after traversing through fields and roads in rural areas, and the lower areas take on the same colour as the ground with the build-up of accumulated muck. The base colour of the AFV can be applied to the upper part of the hull and turret and gradually faded into the 'dirt' colour of the lower section.

A representative dirt colour can be mixed from Tamiya XF-57 Buff, XF-51 Khaki Drab, XF-64 Red Brown and XF-59 Desert Yellow, which can all be varied in ratio to come up with the desired result. I avoid using straight XF-52 Flat Earth (which can also be thrown into the above mix) since it has too much of a reddish tinge and appears unnatural to me.

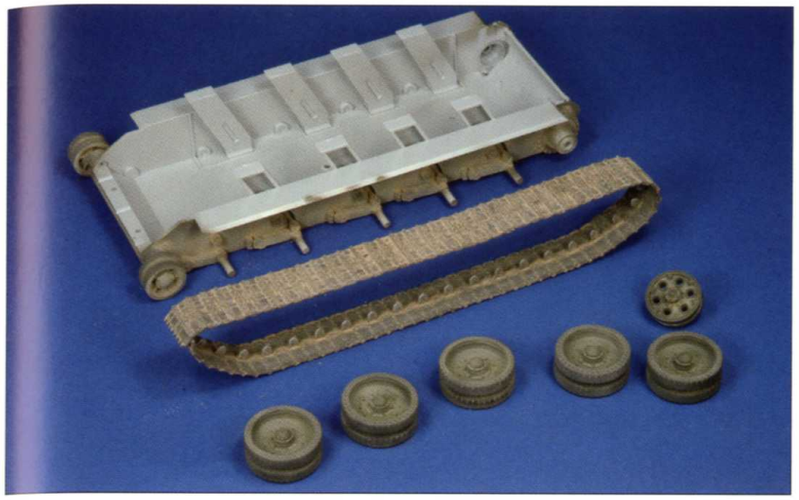
After the initial base colour has been applied, a lightened shade of it should be airbrushed on to highlight some of the features of the model. Adding a drop



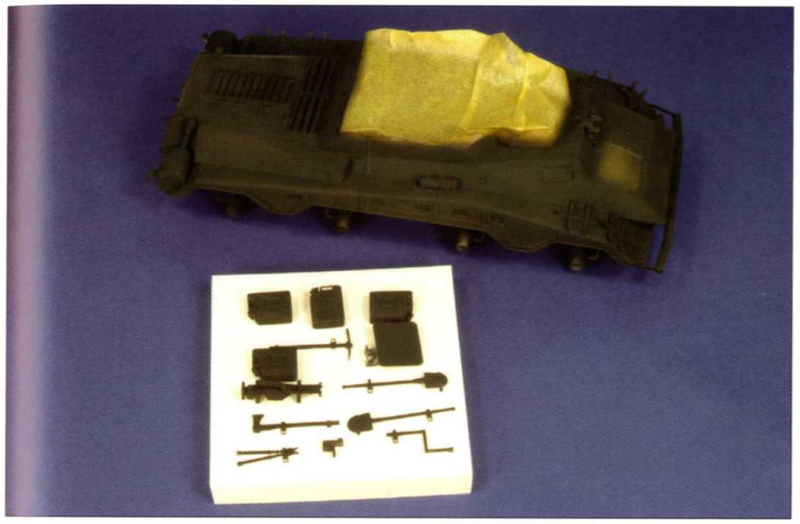
Pre-shading the DML Sherman II was carried out by adding a touch of Tamiya XF-64 Red Brown to XF-1 Black and airbrushing it onto the surface ensuring that every nook and cranny was painted.

The base colour for the model was a mid stone. This was mixed from a variety of acrylics until it matched the colour of Humbrol 84 Mid Stone, because of a preference for the Tamiya brand of paint.

The lower section of the Sherman was completed first to make an easier job of mounting the painted tracks on the vehicle.



The lower hull and running gear of DML's T-34/76 was painted in a dirt colour, and then heavily dusted with pastel powder. Vallejo 888 Olive Grey was then drybrushed onto the wheels and areas of the hull, imparting a dirty-looking green finish.



The main hull and all accessories of DML's SdKfz 243/4 were basecoated with the Tamiya XF-1 Flat Black mixed with XF-64 Red Brown.

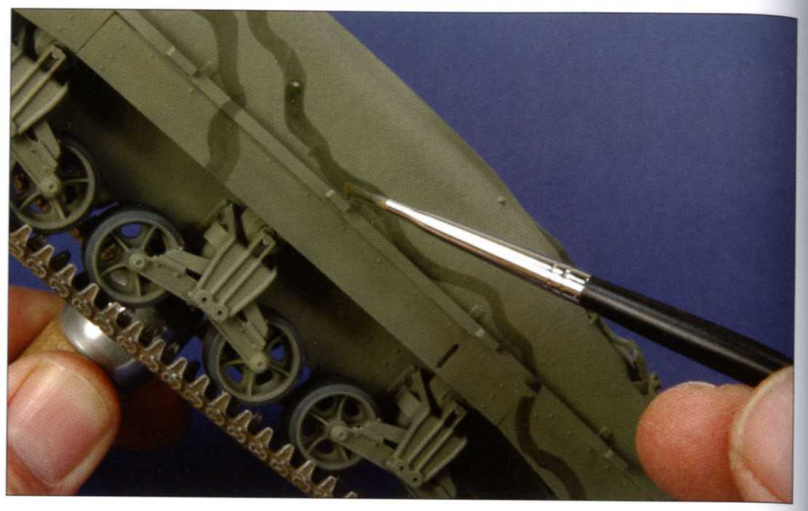
or two of white- and buff-coloured paint to the original mix in the airbrush paint cup lightens the base colour. Thinner should also be added to keep the paint consistency. The tops and corners of the AFV kit's contours can be accentuated by the subtle application of this lighter colour. It can be also applied to the middle of larger areas on top of the turret and engine deck, and also used to suggest fading down the sides and front of the vehicle.

AFV camouflage

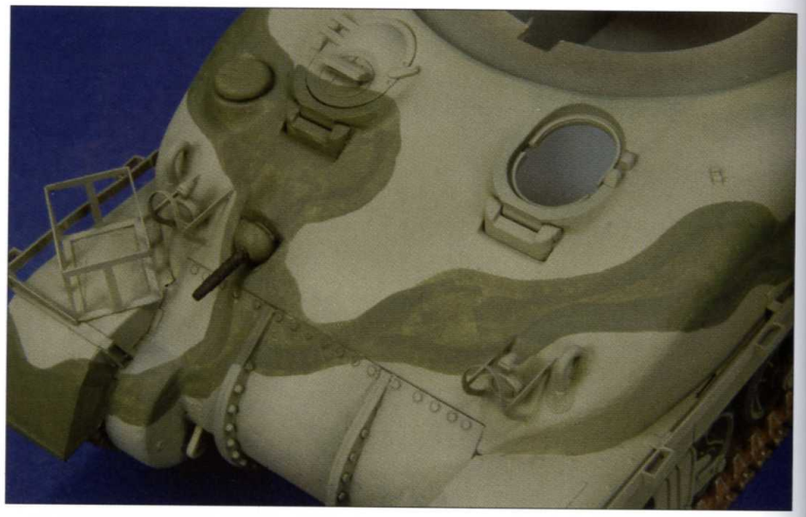
Painted camouflage on AFVs consists of disruptive patterns of colour with either a hard or soft edge of demarcation. Paint applied with a brush or stencil, which gives a noticeably hard edge, can be painted onto the model the same way.

If the running gear and tracks have to be prepainted and installed prior to being attached to the upper half of the model, the finish should be protected with sections of Tamiya's masking tape placed in and around the sponson area.

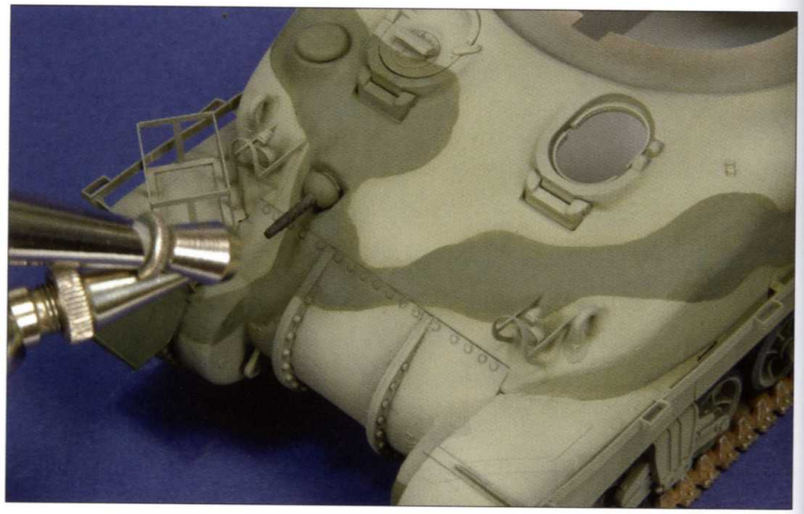
When using masking tape to create a hard-edged finish it helps if there are little or no surface objects to interfere with the smooth edge, though some detail can be masked over and the hazy lines over difficult undulations can be



The outline for the hard-edged camouflage on DML's Sherman II was painted on with a brush. A combination of Lifecolor UA 206 Olive Green and Vallejo 950 Black were used to get the desired shade.



The streaked effect of the brush-painted dark green camouflage is evident, and several thin coats used to fill out the edges.



The dark green paint mix was then thinned with water and sprayed onto the model keeping clear of the edges, eliminating the brush marks.

Tamiya XF-58 Olive Green was airbrushed onto the upper hull of DML's T-34/76 that had previously been pre-shaded with black.

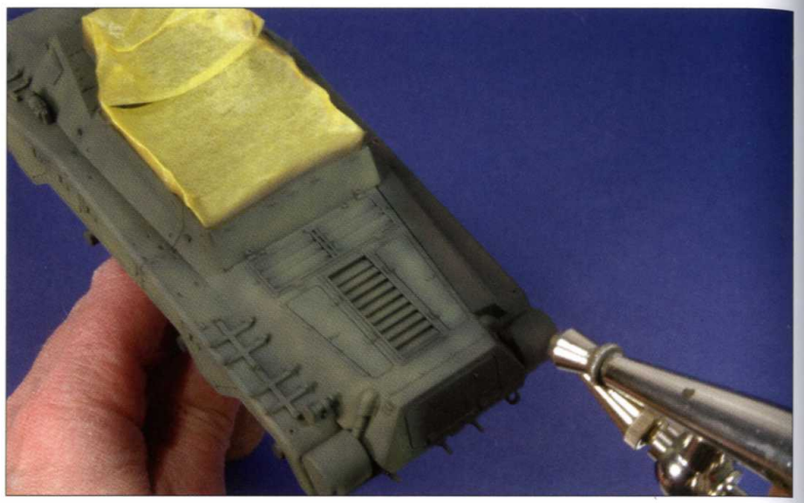
Tamiya XF-57 Buff was added to the paint afterwards to lighten it, and the hull was highlighted in various areas to show fading and variation.

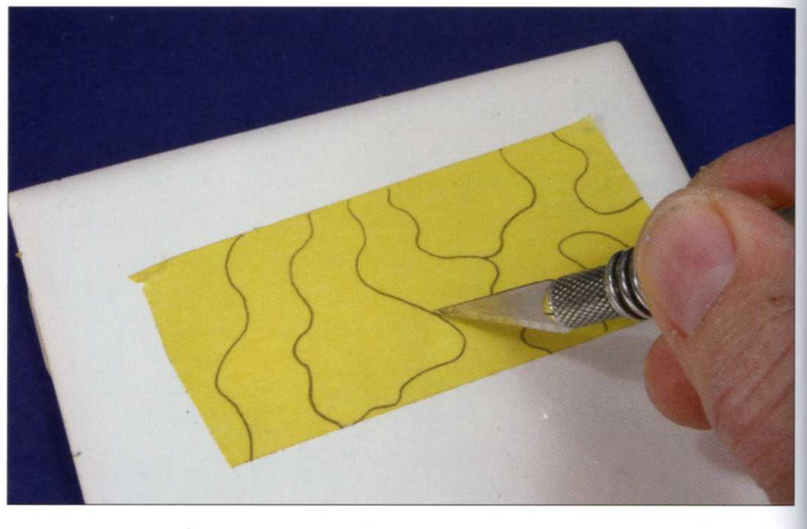
touched up afterwards with a paintbrush. Tape can also pull off some of the delicate detail by sticking to itself and the part at the same time, causing really challenging removal.

To paint on camouflage using a brush, the paint should be thinned to allow a number of light coats to be applied that will help avoid streaks and paint build-up. To minimize the amount of brush-painting, the demarcation line can be applied with a brush and the rest of the camouflage can be sprayed on using an airbrush. The hard-edged line may need to be painted a couple of times to get the required coverage without showing any brush strokes. The British Sherman II was initially base-painted in a Tamiya acrylic mixture matching Humbrol 84 Mid Stone enamel, and then dark green camouflage lines were brush painted on using a mix of Vallejo and Lifecolor acrylics. Airbrushing a thinned-down mix of the dark green acrylic filled in the outlined patches.

The hard-edged, three-colour pattern on the SdKfz 234/4 armoured car was painted using two sets of patterned masks. After painting the base colour of the vehicle dark yellow, Tamiya masking tape was cut into small cloud-shaped pieces and positioned randomly, leaving adequate room for a second set to be placed later. After the first set of masks was placed, the hull was painted olive

Tamiya XF-60 Dark Yellow was diluted to a 1:5 paint to thinner ratio and airbrushed onto DML's SdKfz 234/4 leaving the shadows to show through.





Masks were cut by sketching a pattern on Tamiya 40mm tape and cutting it out using a No. 11 hobby blade.

Tape was placed on the hull over the initial dark yellow with consideration that two more colours would adorn the model. Many of the smaller parts were left off until later, as they would interfere with the fit of the masks.

Olive green, mixed from Tamiya XF-65 Field Grey and XF-57 Buff, was airbrushed onto the model next, followed by a further set of masks being placed on the hull.

The final camouflage colour of Tamiya XF-64 Red Brown was added with the airbrush covering the rest of the model's surface.

The hard-edged camouflage scheme is revealed upon removal of the layers of tape.

green. The second set of masks was placed over this, and the final colour of chocolate brown was sprayed on. Once all of the masking tape was removed a late-war German three-tone camouflage pattern was revealed.

Soft-edged camouflage schemes can be airbrushed onto the model by using a fine line to mark the outer edge of the pattern. The rest of the coloured section can be filled in with a wider, heavier application. Since the paint has to be thinned to a large degree to keep a fine line, a fair number of passes have to be made continuously in the same area to build the paint up to give the required coverage. Photos of the actual vehicles should be used to see how the patterns of colour are arranged, and should be copied onto all sides of the model.

Painting the details

It is important to paint most of the details on an AFV model prior to the weathering stages so that the model receives the weathering over its entirety in a consistent fashion. Vehicle tools, accessories and other stowage items, if not already attached to the model, can now be fitted and painted in their base colours.

Vallejo acrylics are well suited to painting many of the small details on an AFV model. By squirting a very small amount from the handy plastic bottles onto a polyethylene sheet and having a small container of water (for thinning) and a paper towel handy, the many colours and shades needed for painting details can be done efficiently. This water-based paint does not stand up well to handling, and it is advisable to prime even the smallest of tools and accessories beforehand.

The metal details like tow cables and ice cleats were painted with Floquil Grimy Black.

The SdKfz 234/4 tools and accessories were painted separately before being attached to the model.

Brackets for the stowed jerrycans had to be added, primed and painted afterwards using Vallejo acrylics.

Tools that have an exposed metal surface can be painted a very dark grey and have the metal appearance 'weathered' onto them later. The same process can be used on spare track links that are stowed on the vehicle. Wooden handles for the tools, if not the colour of the vehicle, can be base-coloured with a light tan and then have a small amount of raw umber/burnt sienna oil paint added to them to emulate a woodgrain appearance.

Vehicle lights should be picked out in their appropriate colours using a toned-down mix of paint. For the light fixtures on the rear of most vehicles, red or blue should be mixed with a bit of black to give an appropriate shade.

Tow cables should be painted in Floquil's Grimy Black and then drybrushed with the metallic mixture of silver enamel and raw umber oil paint. Since the cables tend to show a lot of dirt owing to the nature of how they are used, dirt-coloured pastel chalk should then be rubbed onto them using an old 000 brush.

Tool straps used on armoured vehicles were either canvas or leather with painted buckles. Any stowage like tarpaulins, petrol cans and camouflage netting should be painted their base colour after priming. Weathering the on-vehicle stowage follows the same methods as for the vehicle itself.

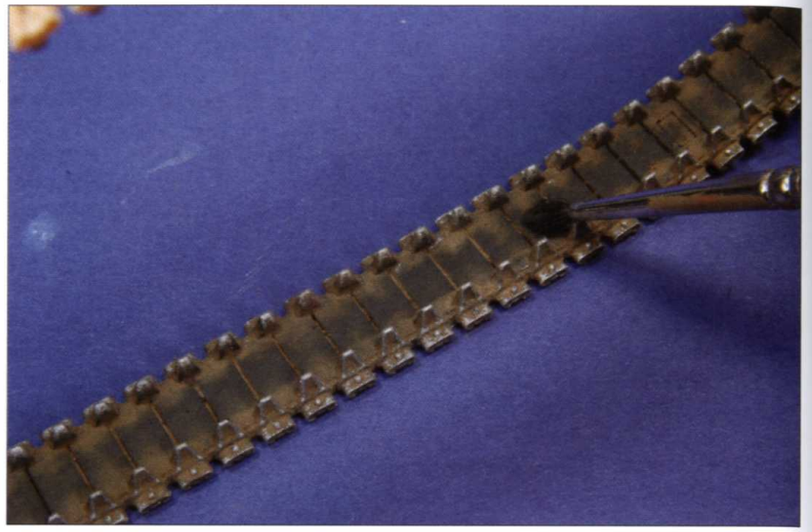
Painting track links

Depending on how you want them to appear, there are many ways of painting track links. After studying the track runs on construction equipment, I have always felt that they tend to take on the appearance of the ground colour and have a metallic grey look to the worn metal sections. Although track links can show rust when left unused for a period of time, I think that rust colour can easily be overstated on an AFV model. Since tracked vehicles are typically modelled during a time of activity, I keep the rust colouring to a minimum.

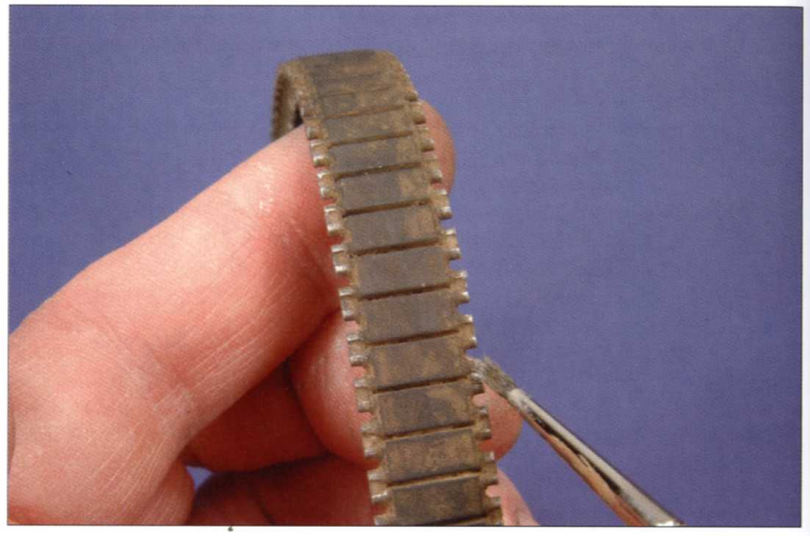
If it can be determined that some of the track will not be seen on the model, it's not worth the time or effort to paint and weather that particular area. Some upper track runs are hidden under a sponson and behind track fenders and guards. The face of the tracks along the area of ground contact would also not be seen. If there is doubt as to what may be visible, the default is to do the work just in case.

After painting the track lengths Floquil Grimy Black, a mixture of pastel chalks in an overall sandy dirt colour were mixed with Tamiya acrylic thinner. This mixture was painted onto the tracks and allowed to flow into the details of the surface.

The rubber surfaces of the Sherman track pads that contact both the wheels and the ground were drybrushed with Vallejo 950 Black.



Silver enamel and raw umber oil paint was drybrushed onto the metal detail of the track runs at points of contact. The pastel was wiped clean of these areas beforehand.

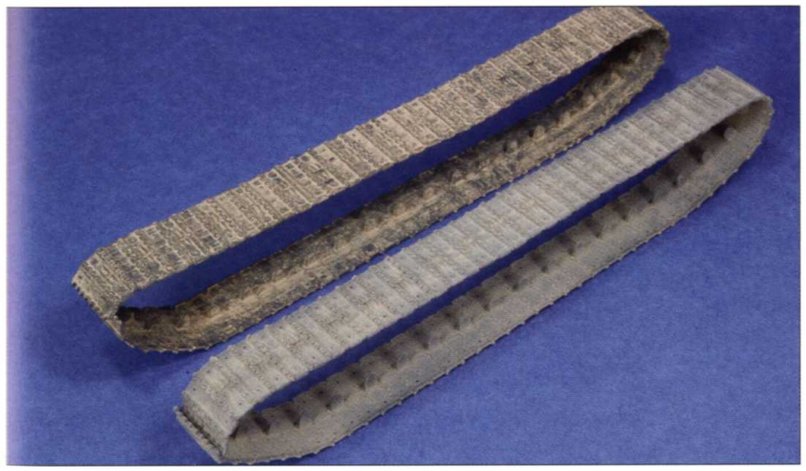


Whether the links come in a soft vinyl, hard styrene, resin or white metal form, the run of links should be primed and painted a dark grey colour. Since I use a weathering technique involving acrylic thinners I prime the track runs with Floquil's Grimy Black, which stands up to the later acrylic-thinned washes of pigment powders and also serves as a pre-shade base. Placing the track links in a kit box lid contains the overspray of dark grey paint as the runs are airbrushed from every possible angle. Most tracks have such crisp detail on them that it's easy to miss painting every nook and cranny.

Because the following steps in the process get a bit messy, it's advisable to do the work on a scrap of polyethylene film. I tape a plastic bag (such as one that contains the model parts' sprues) onto the work table. After the links are completely basecoated, a mixture of dirt-coloured pastel chalks are combined with Tamiya acrylic thinner in a small tin plate. I've typically mixed colours such as raw umber, burnt umber, raw sienna and yellow ochre. The resulting mixture is painted onto the track runs covering the inside and out, top and bottom using an older No. 4 paintbrush. By varying the amount of powder in the mixture one can control the weight of pastels applied to the tracks.

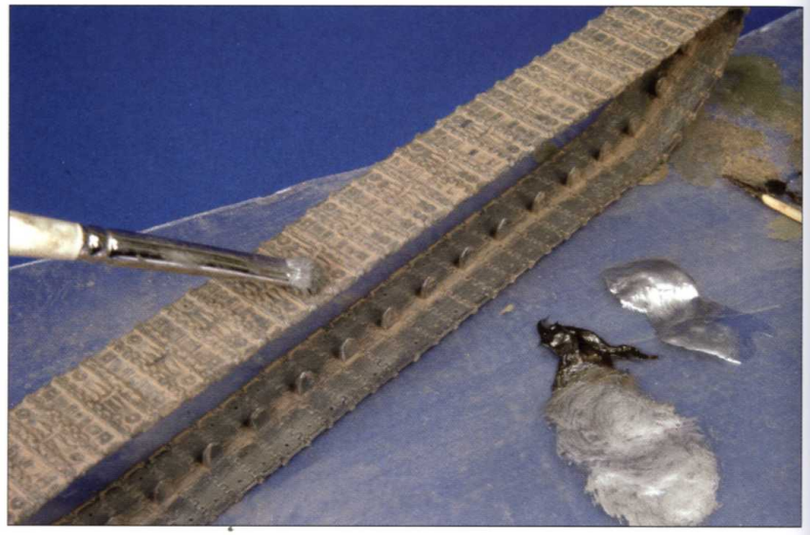
Painting the track runs of the T-34/76 model with Floquil Grimy Black provides a base for adding ground chalk pastel with a dry brush.

The pastel powder can be mixed with Tamiya's acrylic thinner and painted on.



The appearance of the track runs with pastel powder applied in different ways allows the modeller to decide on his preferred effect.

Once the wet pastel application had dried, the track run was brushed with a further dusting of the powder. Working on a plastic sheet helped contain the messy process.



The metalizer mixture of silver enamel and raw umber oil paint was then rubbed onto the surface detail of the track links. The rubber wheels of the T-34/76 would also clean the metal on the inside of the track pads.

HB pencils are handy for adding a metallic finish to the edge of a tank's running gear.

Once the pastel mixture has dried on the tracks, the worn metal areas should be highlighted. Silver enamel mixed with a dab of raw umber oil paint is drybrushed onto the track runs. To help with this application, the high points of the tracks can be wiped with a paper towel moistened with acrylic thinner, removing the pastel powder from the areas that will take on the metallic sheen. Areas to highlight include the track teeth and points of ground contact. Contact with the different roadwheels, idlers and drive sprockets would also impart a worn metal look to the track run.

The shine from Friulmodel's white-metal track links is too bright once the paint is removed, and these links need to go through the same painting process as track runs made from any other media.

For metal track links that need to appear to have rusted with time, wet and dry applications of orange-coloured pastel should be applied to the tracks. The rust colour can be made to vary in intensity by mixing it with various other colours, and by the amount used.

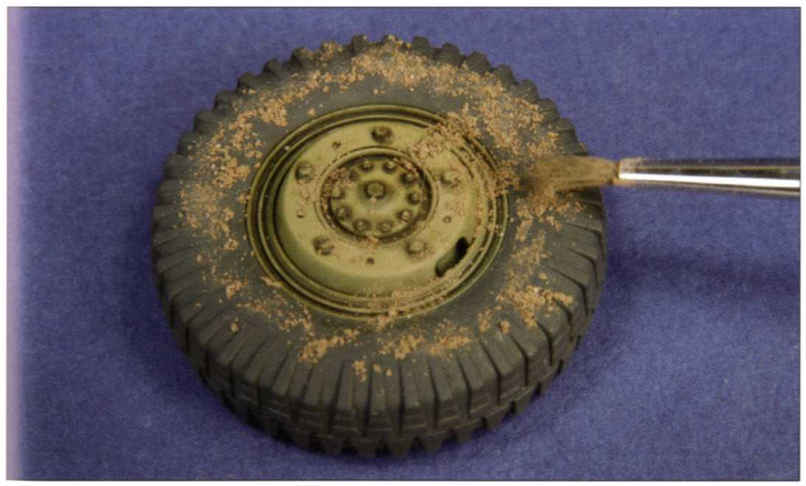
Track links with rubber pads, such as those featured on the British Sherman II, should follow the same process as described above, though only the metal highlights should be drybrushed with the toned-down silver enamel. Matt black paint should then be lightly drybrushed onto the rubber pads, leaving some of the pastel colour to give a suggestion of worn rubber.

Painting wheels

To give vehicle wheels a used and dirty look, they can be painted in much the same way as the tracks. The metal parts of the wheel should get the same painting method as the body of the vehicle, including any camouflage. The rubber part should be painted in a very dark grey, and again Floquil's Grimy Black works well for this.

To add an oil-paint wash to the wheel, black can be mixed with raw umber to give more of a grease-stained look to some of the details. This same oil-paint wash can also be added after dirt-coloured pastel powders have been applied in the following method.

Small mounds of dirt-coloured pastel mixture can be placed randomly onto the side of the tyre wall and the wheel. Tamiya's acrylic thinner is then allowed to soak into this by touching a well-loaded No. 4 paintbrush near the pastel deposits. This mildly adheres the powder to the tyre and wheel. When dry, an additional dusting of the pastel dust is brushed onto the entire wheel and tyre, then rubbed off with a paintbrush and finger to expose more of the dark rubber tyre where it would touch the ground. Some of the pastel caked to the tyre side



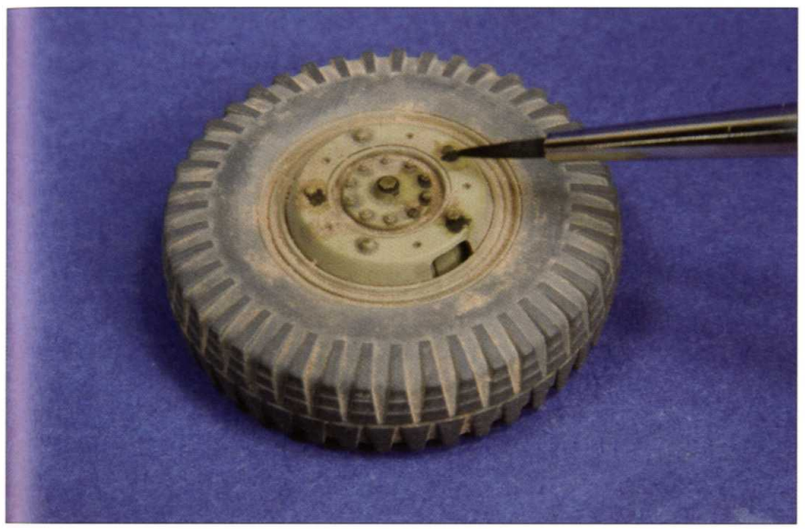
Painting the wheels followed the process described for the vehicle hull. The tyres were painted using Floquil Grimy Black. Pastel powder was then piled onto the wheel's outer surface.

Tamiya acrylic thinner was allowed to soak into the piles of pastel powder.

The pastel powder loosely adhered to the wheel and tyre surface.

Loose pastel powder was next brushed onto the entire surface of the wheel.

Using a brush and finger, the pastel dust was removed from the running surface of the tyre, and also taken off the sides to leave a realistic residue.



Grease stains were added using thinned black oil paint randomly to some of the wheel's bolt detail.

wall will flake off, giving a realistic look to the whole thing. Thinned black oil paint can now be reapplied to emulate grease stains on some of the bolts and other details as a final touch.

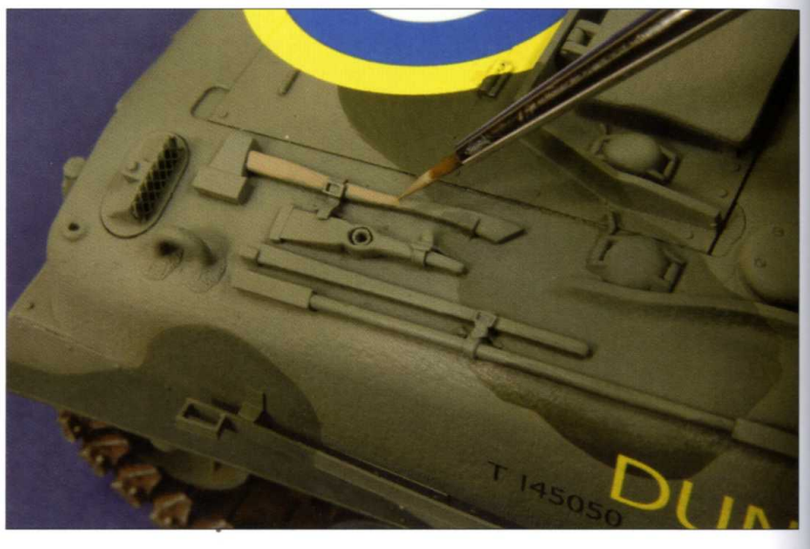
Markings

Decals and other markings can either be added to the model at this stage or after the weathering process. If waterslide decals are to be added when the base colours and camouflage have just been completed, the surface of the model must be airbrushed in a clear gloss finish. I try to keep this gloss coat to a minimum area, spraying the model only where the decal will be applied. Either Future floor polish or Tamiya acrylic gloss will work well for this. In some cases a decal may have to be placed before gluing on a part that makes the surface too awkward to manage later.

If dry rub-on transfers are used, then the surface can be left in a matt finish. The dry transfer can be positioned on the model and held in place with masking tape before being rubbed onto the model using a burnishing tool like a ballpoint pen. It is fairly important not to press too hard when applying the dry transfers,

Tamiya's gloss coat was sprayed onto areas that were to receive waterslide decals.

After the markings had been applied, all of the other small details were painted in with Vallejo acrylics. The tool's wooden handles were coloured with Vallejo 921 English Uniform with a touch of white added.



or else the marking could be distorted or damaged. The disadvantage of this type of marking is that you only get one chance to do it right.

Waterslide decals should be soaked in water and then slid onto the glossy surface of the model after dampening it with a spot of water. The decal should be carefully positioned and then the air and excess water pressed out from underneath with the use of a dampened paper towel. Adding a few drops of Solvaset to the decal will allow it to soften and form over the contours of the surface. If the decal has to be placed over an extremely uneven surface (for instance a protruding periscope or view port) where its shape could be altered in the process, it helps to cut the marking into sections beforehand, and possibly hand paint the gap formed as the sections are placed around the difficult area.

Occasionally there may be no appropriate marking to be found for a certain modelling project, in which case a marking can be hand drawn. By lightly marking out the dimensions with a pencil, numbers and letters along with other types of graphics can be painted onto the model using a steady hand. For this type of work it's important to use a fine-tipped brush and paint with a concentrated pigment. Vallejo acrylics have the best flow from a smaller brush

Temporarily assembled, the SdKfz 234/4 shows how toy-like a model can appear without any weathering.

for this kind of work. Sections of existing decals can be modified to meet some marking needs, and occasionally one only needs to alter a decal's colour to obtain the required marking.

After markings have been applied and cured, they should be sealed with gloss finish and eventually airbrushed with a coat of clear matt finish to match the rest of the model. If the markings are to be applied after the model is weathered then they should be appropriately muted in order not to appear too bright, assimilating with the overall appearance of the model.

Weathering AFV models

The weathering stage is where the model is transformed from looking like a toy into a realistic representation. The process can be quite short, or almost never-ending depending on how far the modeller wants to carry on the process. The steps described here reflect what I carry out on a project in general. The methods could be done in a different order depending on circumstances, and repeated when necessary to achieve a desired look.

Step 1 overall light dust

After the colour scheme has been applied, the details painted and markings in place, I then lightly airbrush the model with a very dilute light dust colour. This application serves to give the kit a scaled look by emulating how it would look at

Dirt-coloured paint can be mixed up by using a mix of the Tamiya acrylic colours displayed with the airbrush paint cup.

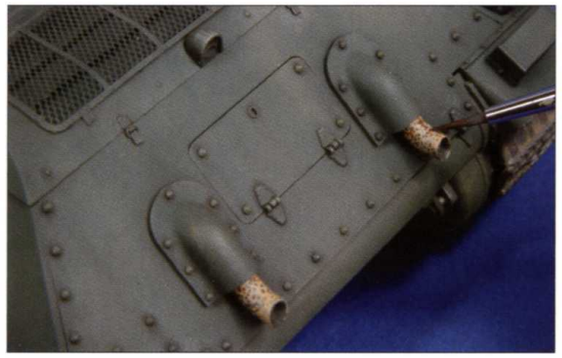
The SKfz 234/4 was airbrushed with a very dilute mixture of the dirt-coloured acrylic. This tones down the overall look of the camouflage pattern and other details.

a distance, since there is an amount of fine dust and debris in the atmosphere. It also blends the various components of the model together visually, taking away some of the harsh colour contrasts of camouflage and other details. The smaller the scale of the model, the more effective this technique is. The dust colour should be made up from colours like Tamiya's XF-57 Buff with some white mixed into it, and concentrated in areas such as the lower section, rear end of the vehicle, and along the running gear where things tend to get a bit more filthy. The dilution for this coat is approximately 1:20 paint to thinner, and should be gradually applied to control the effect.

Step 2 painting silencers and exhaust pipes

The silencers and tailpipes on AFVs are typically painted the colour of the vehicle. Soon into their service life, however, the heat of engine exhaust damages the paint which eventually flakes off and the whole system takes on a rather tired appearance.

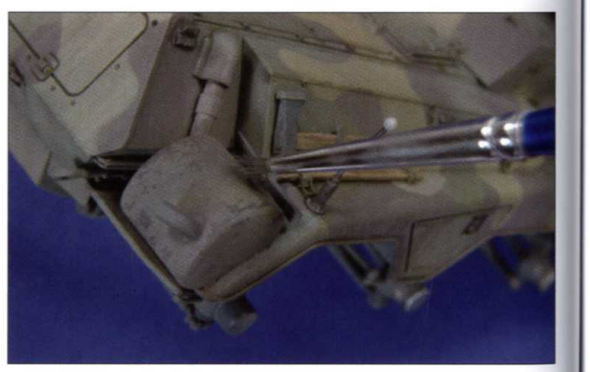
After the model has been completely painted, dark brown patches are painted randomly on the silencer to show where heat has caused paint to flake off. The patches vary from small spots to larger areas of flaking. To blend these patches into the silencer, varying shades of brown chalk pastel powder are brushed on until the desired effect is achieved. A varied appearance of the original vehicle colour and a mottled heat effect from the exhaust should be the eventual result.



The exhaust pipes of the T-34/76 were painted Testor's SKU 1167 Flat Desert Tan enamel. Small dark brown spots were then painted onto the pipe.

Dark brown pastel chalk was then brushed onto the surface to blend out the spots and give a burned look to the pipes. Black pastel was then added to the inside of the hollowed-out exhausts.

Silencers of the SdKfz 234/4 were painted with dark patches using a dark brown mix of Vallejo acrylic paints.



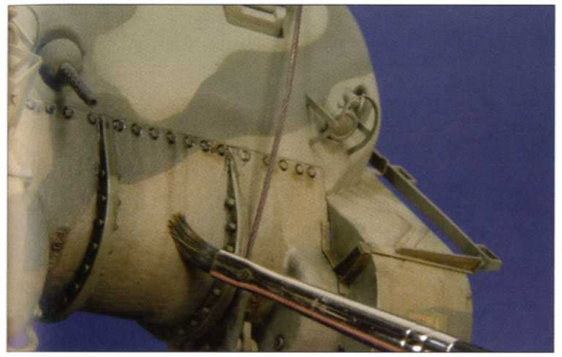
Brown pastel chalks were rubbed onto the silencers, blending in a scorched look to the components from the effect of heat on the paint.

Exhaust pipes show a more severe effect from heat, turning an orange colour from the rust. These should be painted pinkish and then spotted with very small dots of dark brown. Over this, a combination of orange and black chalk pastel or pigment powder should be added to blend out the harsh spots and give a burned, dusty appearance to the pipes.

Step 3 oil-paint wash

As opposed to the method described previously for aircraft kits, I apply the oil-paint wash to AFV models while they are still in their matt finish. A small area of the painted surface is dampened with mineral spirits, and then a thinned mixture of oil paint is touched to the detail using a 000 brush. The pigment of the oil colour wicks around the detail, and the dampened area prevents tidemarks. If some of the oil paint contaminates the wrong areas it can be swept away with a clean No. 4 brush dampened with thinner. Knowing how much of the paint mixture to load on the brush, andwhat concentration to use is something that experience and experimentation determines.

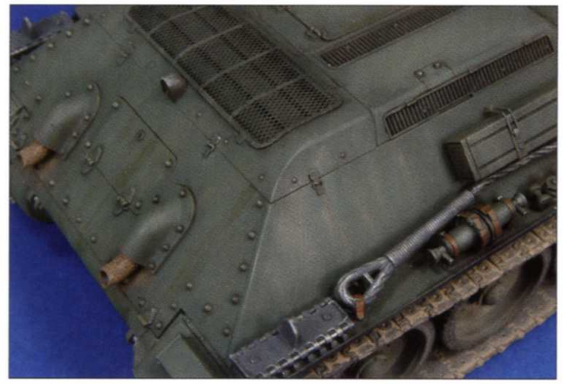
Small dabs of oil paint can also be placed randomly on the model and pulled downward using a dampened No. 4 brush. These streaks form weathering marks that break up the monotony of a plain surface and add the character of rain streaks and corrosion. Typically, dark brown does the job, but whites, yellows and other earth tones can be used effectively.



The entire Sherman II received a wash of artists' oil paint by dampening small sections with mineral spirits and allowing the thinned oil paint to wick into recesses and details on the model's surface.

Straight oil paint was dabbed here and there during the process and dragged in a downward direction to show streaks and smears caused by weather conditions.

To give further tonal differences to the monotone green, spots of oil paint were placed randomly onto the T-34/76 hull's surface.



The oil paints were worked into the surface of the model with a clean, dry brush until just a suggestion of colour tone remained.

A wash of oil paints was added to the SdKfz 234/4, one section at a time. The kit was dampened with mineral spirits, then thinned raw umber and black oil paint were added to the surface details.

Oil-paint washes can also affect decals. Harm can be avoided if decals are protected with an acrylic finish beforehand, or added to the model afterwards and weathered separately. Decal film can be unintentionally accentuated by an oil-paint wash, and care should be used to avoid this.

Step 4 drybrushing

Faded paintwork on the upper surfaces of the model can be shown by drybrushing on a lighter colour than the base. The base colour can be lightened using a number of colours, with tan and flesh being more effective than white in many cases. White tends to make things look a bit bleached out and chalky, but flesh tone gives some shades of colour a bit more warmth. Dark olive green is nicely lightened using a yellowish colour, but some experimentation on a palette is helpful when trying to determine quantities and shades.

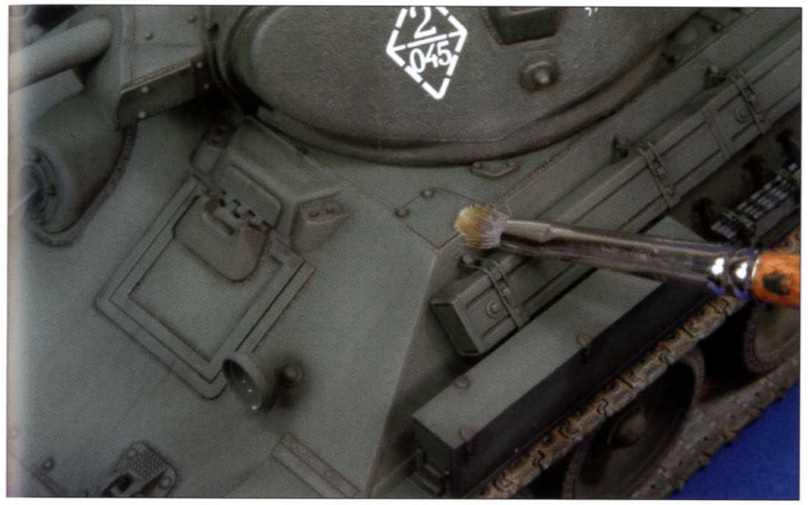
Drybrushing should be carried out on a matt finish as the paint is drawn off the brush using the friction of the surface. Enamel paint is ideally suited to drybrushing, but can be damaged if a petroleum-based wash is applied over it.

The brushing technique for this effect should be outwards from the middle of the vehicle, and downward on the sides. Streaks should be avoided by keeping the amount of paint on the brush to a minimum. The method is also helpful in bringing out the detail on the model's surface, and subsequent drybrushing in lighter shades of the base colour can further enhance this highlighting effect.

Drybrushing a multicoloured camouflage scheme involves mixing a different shade for each of the colours. For some of the smaller painted details, each of them can be drybrushed separately for detail enhancement, and to highlight the upper surfaces. It is tempting to just drybrush everything using a typical colour of light khaki, but the job is certainly more convincing if the drybrushed colours are matched to the specific parts of the model.

Drybrushing with silver enamel toned down with raw umber oil paint enhances the look of worn bare metal. Equipment such as shovel and axe blades, crowbars and the metal parts of weapons are highlighted this way. Parts of a tank that also see the paint worn down to the bare metal are the ends of the main gun barrel and areas where the crew frequently climb near the hatches and turret. Since mineral spirit thinners can certainly damage this, it is usually a step left until the end of the weathering process just in case further oil-paint washes are required.

Drybrushing with a toned-down silver enamel highlights the features of the kit's worn metal details.



The hull of the T-34/76 was drybrushed with Humbrol 29 Dark Earth, followed with 179 French Artillery Green. The latter colour is no longer available, but resembles a faded olive drab colour.

By drybrushing the model, the various features and details stand out visually.

Step 5 mud and dust

Beneath an AFV there is an accumulation of dirt that builds up over time. Before the running gear is attached to the model, dirt accumulation can be modelled by using pastel powder, pigments or commercially available products to create miniature groundwork.

A generous amount of pastel powder was placed onto the model's surface. A paintbrush, soaked with Tamiya acrylic thinner, was gently touched to the model's surface, allowing the thinner to soak into the pastel powder, wicking itself throughout. This process can take some time to do since it must be carried out over several areas. Once dried, more pastel powder can be lightly brushed into these areas to fill out the look of the dirt-encrusted bottom. Some of the accumulated build-up may come loose, but the overall effect is accomplished. Since this is a rather messy task, it's advisable to work over a large piece of polyethylene. This also helps with recovering some of the pastel powder that doesn't adhere to the model.

To vary the look of the dirt, acrylic paste can be thinned with water and soaked into the accumulations here and there. The patches will dry slightly darker and will emulate areas of wet mud.

Dirt-coloured pastel dust was rubbed onto the hull on the lower regions of the hull, and rear of the tank. It was also applied to the fender areas, and generally over the entire vehicle for a consistent appearance.

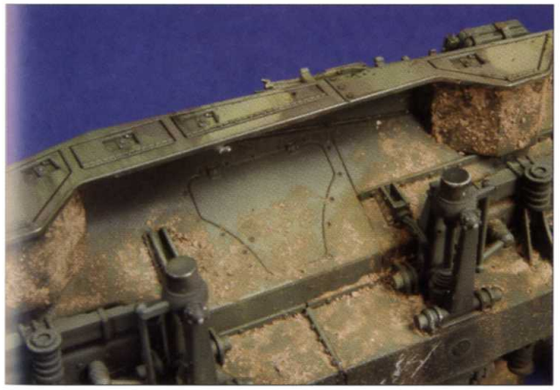
For a model with a single colour, the tone of that finish can be made more interesting by varying the shades utilizing various weathering techniques.

A mix of Vallejo 950 Black and 921 English Uniform was painted on the SdKfz 234/4 with a fine-tipped brush to show scraped and chipped paint around edges and corners of the model's surface.

To emulate caked dirt on the visible underside of the model, chalk pastel powder was heaped onto the upturned hull.

Tamiya's acrylic thinner was loaded onto a No. 4 brush and allowed to soak into the powder where it sat.

Working through the underside one section at a time, the entire visible area receives the pastel treatment.



Once dried, the pastel powder loosely adheres to the surface of the model in clumps.

To complete the effect, loose pastel powder is dusted in and around the caked-on material. To create the look of mud that is partially still wet, acrylic paste or thinned gloss coat can be randomly dabbed on in various spots.

Pastel dust was also added to the lower hull sides, and continued up eventually to treat the surface of the model's exterior entirely. The focus of the dusty effect is to the rear and lower end of the vehicle.

Pastel dust can be brought up the sides of the vehicle by brushing small amounts onto the fenders and armoured walls. The visual effect of the powder can be dramatic, and it's quite noticeable where it has been applied and where it hasn't, so the whole vehicle will have to be treated to give consistency to the overall appearance of the model, with the heavier accumulations being to the lower and rear ends. Pigment powders can leave an even heavier colour deposit, and caution over their application is a must.

The powder will come off if touched, but is hard to remove completely from a matt surface. Care should be taken not to touch the model's pastelled surface to avoid any hideous fingerprints.

Step 6 chipped paint

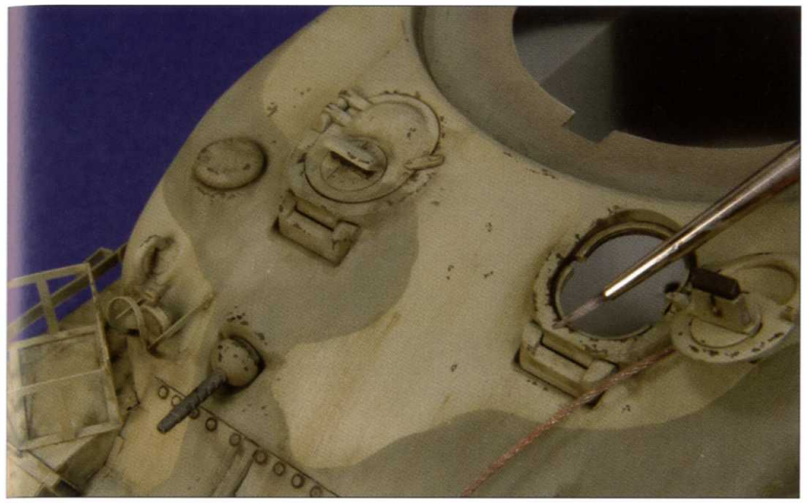
Simulating chipped paint on an AFV model can enhance the detail tremendously and add a realistic touch to the overall look of the kit. The technique can easily be overdone, so it's important to take some time to stop and review the look of the model occasionally throughout the process.

When paint is removed from a surface it can reveal the base colour over which it's been painted, or the primer or even the bare metal. Paint chips can therefore be emulated in these various colours, showing the damage to different degrees.

Consideration of where the damaged paint occurs is important to the effect. The most convincing efforts are those which show the application near crew hatches and stowage bins, edges and corners of the vehicle that could brush against terrain, foliage and other obstructions, and other parts of the vehicle that display wear and tear during their service.

There have been numerous techniques described in the hobby press on how to model damaged paint. One method is to paint on a removable rubber compound or hairspray on an undercoat to pull it off once topcoat has been added. This technique is extremely useful when modelling a vehicle that has lost a fair percentage of its winter whitewash. Another method is to have a very thin border of lighter paint around the paint chips themselves, showing the traces of the layers of paint underneath. To carry off these advanced methods takes great time and patience. Described here is a simple method to achieve the effect.

Using either Floquil's Grimy Black or a dark brown mixture of Vallejo's acrylic paints and a 000 brush, small random dots should be painted onto the model in the areas described above. The placement of the dots should be irregular and occasionally they should join together indicating heavier wear. The dots should also be jagged or oddly shaped. Damaged paint on construction vehicles



Small paint chips were added to DML's Sherman II using a mixture of Vallejo 950 Black and 985 Hull Red. Thinning the paint out varies the intensity of the small marks.

or playground equipment should be studied to get a feel for how the effect should appear.

For larger areas of damaged paint, such as the metal floor of an AFV, some abrasive pad or an old stippled paintbrush should be used to dab numerous spots into place, with care taken to get the right amount of 'spotting' and ensure that the pattern of the applicator is not obvious. A test 'blot' on a piece of paper before each application is advisable.

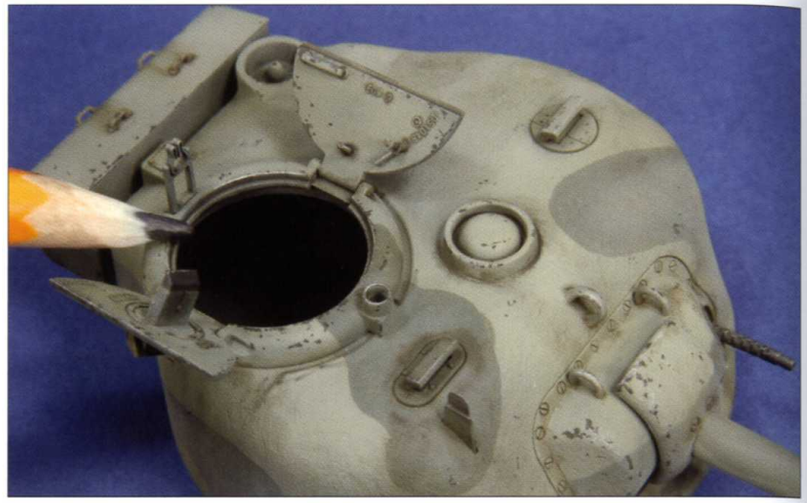
Step 7 finishing touches

Inevitably during the painting and weathering process, there is a need to repair broken detail or add some of the more delicate parts left to the final stages of the build. In some cases, paint has to be removed to glue on some of these parts, and the area of the model has to be touched up to hide the marks. By using a few drops of Vallejo acrylic on a plastic sheet palette, any blemishes from cyanoacrylate glue or bare plastic from scratches can be painted over by mixing an appropriate colour and dabbing it into place.

If decals or other markings have been added and appear to stand out too loudly, raw umber oil paint can be used to bring down the brightness. Add a very small dab of the straight oil paint to the decal, and then brush it around and blend it into the surface until the desired effect is achieved.

Oil stains on the engine deck were painted on using Lifecolor TSC207 Oil. This acrylic paint is one of a line of weathering colours, and dries with a translucent sheen.

An HB pencil was used to give the hatch areas a worn appearance from service use. Pencil lead can be ground down and used much the same as pastel and pigment powders for these types of effects.



Two figures from the Ultracast line were added to the model to give it some life and perspective.

The unit markings on the front and rear had their brightness taken back by painting on small amounts of straight raw umber oil paint.

Dark metal parts of the mounted tools were painted black and highlighted using silver enamel and raw umber oil paint.

The large roundel on the engine deck had to be weathered down using an airbrushing of light dust. When first applied, the look of the decal was much too vivid. The dust coat was applied to the entire model, but concentrated on the roundel until the desired effect was achieved

When compared to the photo of the SdKfz 234/4 shown on page 61 taken prior to the weathering process, it's easily seen why the extra effort produces a much more appealing result.

The interior of the muzzle brake was given a brushing of black pigment powder. All metal parts of the tools were highlighted with a drybrushing of toned-down metalizer.

The 7.5cm gun of the SdKfz 234/4 was weathered to show worn paint. An HB pencil was used on the breech, and paint chips were added around the entire working area.

Figures and presentation

Figurines add a touch of perspective and life to models when painted and presented with them on a decorated base. Many modellers are intimidated at the idea of painting a figure to go with their kit, perhaps because of the incredible work that has been published in magazines and books on the subject of figure painting.

To paint some of the masterpieces that appear in contests and printed articles can take weeks. A less time-consuming process is more suited to a modeller wishing to add figures to a vignette or diorama. While I'm certainly not an accomplished figure painter, the following fundamentals can help achieve miniatures suitable for use with AFV and aircraft models.

An Ultracast resin figure was used for the Sherman II. The figure features very sharply sculpted detail, and is ideal for painting shadows and highlights. The face and arms of the figure were primed using Testor's SKU 1167 Flat Desert Tan.

Using an old trick from master modeller Steve Zaloga, the pupils of the eyes were indented with a needle, keeping them straight and looking in the same direction.

With burnt sienna and white oil paint, a flesh tone was mixed up on a plastic sheet palette.

After the enamel undercoat was allowed to dry for a few days, the paint was applied to the face in a very thin layer. Any excess was wiped away with a paper towel.

Burnt sienna and a small amount of raw umber were combined to make a dark colour that was painted with a fine brush on the underside of the face's shadow areas.

White oil paint was applied to highlight the outer points of the face such as the chin, cheeks and nose.

After blending a tiny dab of red to give the upper cheeks and lower lip some colour, Payne's Grey was added to the chin and neck area to show a subtle five o'clock shadow.

The figure's arms were painted in a similar fashion to the face, blending shadows and highlights with the basic flesh tone. Humbrol 29 Dark Earth and 72 Khaki Drill were combined to paint the basic colour of the figure's shirt and trousers.

By using the bottle caps to mix and blend the enamel paints, a series of highlights and shadow tones were painted onto the figure's uniform.

Enamels don't quite blend like oils, but dry quickly and give good coverage. The figure's cap was lightly drybrushed with Humbrol 72 Khaki Drill after being painted flat black.

Another method of painting figures is to paint them black, and then airbrush on their uniform colour, utilizing a shadow effect from the base coat.

The figures had their uniforms airbrushed in Tamiya's XF-65 Field Grey, and their equipment brush-painted in various Vallejo acrylic colours.

The bare metal wear was highlighted with an enamel metalizing mixture of silver and raw umber oil paint.

The faces and hands were painted in oils. Drybrushing the uniforms and accessories brought out the detailed appearance.

Two Ultracast resin figures were added to the Sherman II build from the previous chapter. The details on resin cast figures are on the whole very well defined, and lend well to the process of emphasizing light and shadow with paints. The flesh parts on the figures were finished in oil paints and the uniforms were painted using enamels. Oil paints allow excellent blending capability. Painting a face involves deepening the shadows and raising the highlights when light hits the surface features. By studying a photo of a person's face in sunlight, the areas that have to be emphasized become clear.

To begin the figures' faces, the pupils of the eyes were carefully pierced with a needle ensuring the depressions were kept straight. The figures' faces and arms were primed with Testors' SKU 1167 Desert Tan enamel, which has a dark skin tone look to it. After letting this dry for a few days, white and burnt sienna oil paint were blended to form a deep flesh colour and then very lightly brushed onto the face. The key to using oil paints on the faces is to apply very little, and not build up a thick layer in the process. The 'whites' of the eyes can be left in the desert tan colour, since painting them white would give the figure a strange surprised look. From a distance, the 'whites' of a person's eyes are certainly not white any more.

A mix of burnt sienna and raw umber oil paint produces a dark brown colour that can be used to paint shadows onto the figures' faces. Using a 000 brush or smaller with a fine point, the depressions where the side of the nose meets the eyebrows can be darkened, and the paint blended down the sides of the nose and under the eyebrows. Other points to darken are under the nose, the bottom lip and the chin. Other lesser defined areas that can use a blended shadow look are the sides of the head near the temple, and the lines that run downward at an angle across the cheeks from the bottom of the nose.

When adding each of the shadows, the edges of the colour can be blended. It is again important to use a minimum amount of paint to prevent a build-up that produces a muddy-looking colour.

Highlights to the flesh can be added using a small amount of white oil paint. The outline of the high points of the nose, chin and cheeks should be emphasized this way, along with some of the miniscule details like the tops of the lower eyelids, ears and upper parts of the eyebrows.

A touch of red oil paint can be added to the dark flesh mix and painted onto the lower lip, and also blended into the upper cheek area where the 'rosy cheek' term gets its name. Since these effects should be kept subtle, a very small amount of paint is used. If things are starting to look unsatisfactory, the paint can be removed with a cloth dampened with mineral spirits and the process restarted, although this may remove the enamel base as well. Oil paint will dry over a long period of time unless thinned with mineral spirits, in which case the drying time becomes much shorter and the finish becomes more flat like the base coat.

After the face has been shaded and highlighted sufficiently, it can be left to dry for a few days. After a day or so, Payne's Grey oil paint can be worked into the area of the male face to show the effect of unkempt whiskers, also referred to as five o'clock shadow.

The uniforms were basecoated in Humbrol 72 Khaki Drill and then shaded and highlighted with dark brown and white enamels. Plastic-coated bottle caps work well for taking a small amount of paint and blending it together, along with some mineral spirits that can be held for convenience in a similar bottle cap. After a day or so of allowing everything to dry, the figure can be revisited, and the process of shading and highlighting continued until the desired result is achieved.

Another method for painting uniforms is to airbrush the entire figure black, and then airbrush on the basecoat of uniform colour. This essentially begins the shading process by allowing the lower parts of the folds to retain the dark appearance from the black undercoat. Not only is the uniform pre-shaded but

Adding the German infantry figures to the base of the 'abandoned' Russian T-34/76 presents the model with perspective of its size and adds some life to the display.

also the weapons, equipment and other accessories, which are brush-painted afterwards. The uniform can be drybrushed with a lighter version of the base colour to further bring out the sculpted detail.

Colours for the equipment carried by the figure can also be drybrushed, leaving the darker base colour as a weathering effect. Before adding any enamel paint to the figure, especially a silver metalizing touch, the various components of the figure's equipment can be given a dark wash of oil paints to further enhance the weathered look.

Camouflage clothing presents a more difficult challenge to the modeller to shade and highlight, since each colour needs to be individually darkened or lightened (similar to AFV weathering). The approach that some modellers take is to drybrush the entire span of colours with something like a light khaki; however, this type of short cut compromises the results. Painting shadows using thinned dark oil paint in the creases of the clothing, with suggestions of highlighting on the upper detail using a lighter mix of the base camouflage colour is an expedient way of finishing the camouflaged garments.

Index

References to illustrations are shown in bold.

acrylic paints 6–7, **6**, **11**, **14**, **28**, **36**
  advantages/disadvantages of 6, 53
  removal of excess **19**
  thinning of 7, 15, **22**, **23**, 45, **50**, 53
acrylic paste 66, **67**
adhesive putty **12**, **23**, **26**
airbrush (single-action) 4, **8**, 9, 10
  air compressor/supply 8, **8**, 9, **22**, 26
  cleaning of 8, 10
  clearing of tip blockages 26
  consistent flow 15, 24, 26–7
  disassembly of 8, 10
  propellant for 9
  test-spraying 10, 26
  use of 6, 15, 16, **16**, **19**, 20, **21**, **22**, 23, **23**, 24, **24**, 25, **25**, 26–7, **29**, **30**, 31, **32**, 35, **35**, **36**, **37**, 38, **39**, **43**, 44–5, **44**, **46**, **48**, 49, **50**, **51**, 52, 54, 59, **60**, 61–2, **71**, **76**, **77**, 78–9
Albatros DVa 5, **5**, **13**, **14**, **17**, **18**, **20**, **21**, 22, **24**, **25**, 27, **27**, **28**, 29, **34**, **42**

base colours **12**, 15, 45, **46**, **47**, 49, 64, 65
Bristol Beaufighter TF.Mk.X 5, **13**, 16, **17**, **19**, **23**, **29**, **30**, 31, **32**, **36**, **37**, **38**, **39**

camouflage schemes 11, **21**, **22**, 23, **23**, 25, 31, **31**, 64
  hard-edged 10, 24–5, **24**, 47, **48**, 49–50
    three-colour 49–50, **50**, **51**
  pre-cut masks **22**, **23**, 24, **24**, 25, **26**, **50**, **51**
  soft-edged 22, 26–7, 52
  splinter-type **22**
  woodgrain 27, **27**, **28**, 29
canopies/canopy frames 10, 11, 18, **19**, **21**, **36**
ceramic/glass tiles, use of 22, 23, **23**, 24
chalk pastel powder/dust 7, 10, **10**, 16, **18**, 31, **35**, **36**, 38, **41**, **45**, **47**, 53, **53**, 54, **54**, **55**, **56**, 57, **57**, **58**, 59, **59**, 62, **62**, 63, 66, **66**, **67**, 68, **68**, **70**
cockpits 11, **11**, **12**, **13**, **14**, 15, 16, **20**, **22**, 29, 40

decals (waterslide) **13**, **25**, 29, **30**, 31
  application of 33–4, **33**, **34**, **41**, 45, 59, 60–1, **60**
  damage to **33**, 34, **34**, 64
  protective finishes 7, 40, 59, **60**, 61
  toning down of 33, 60, 61, 69, **70**, **71**
drybrushing 10, **10**, **12**, **13**, **14**, 15, 16, **16**, **18**, 31, **38**, **39**, **44**, 45, **47**, 53, **54**, **55**, 57, 64, **65**, **72**, **76**, 77, 79

enamel paints, use of 6, **6**, **12**, **14**, 16, **18**, **26**, 31, **39**, 40, **71**, **74**, **75**, **76**, **77**
  application of **13**, 16, 64, **65**
  effects of petroleum-based washes 64
  mixing and blending of **76**
  thinning of 7
engines **14**, 16, **16**, **17**, 35, 40, 47, **69**

figures 7, **70**, **71**, 73, **73**, **74**, **75**, **76**, **77**, 78–9, **79**
flat/matt coat finish 7, **7**, **39**, 40, **41**, 61

gloss coat finish 7, **7**, 11, 15, **22**, 23, **23**, 24, **24**, **26**, 27, **27**, 29, 31, 33, **33**, 34, **34**, **36**, **40**, 45, 59, **60**, 61, 64

Hawker Typhoon IB 5, **13**, **19**, **21**, **26**, **27**, **30**, 31, **31**, **33**, **39**, **41**
hobby blades, use of 23, **23**, 24, 34, **50**
hulls 44, 45, **47**, **49**, **50**, **51**, **66**, **67**

instrument panels **13**, 15
invisible thread, use for antenna wire **40**

Junkers Ju 87B-2 Stuka 5, 11, **11**, **12**, **19**, **22**, **32**, **33**, **35**, **36**, **40**

lacquer hobby paints 6, **6**, **8**, 22
laminated wood look **28**
landing gear bays/doors **26**, **32**
landing lights **32**

masking tape, use of 10, **12**, **17**, 18, 20, 22, **22**, 23–4, **25**, **27**, **28**, 29, 47, **50**, **51**
  bands/stripes 10, 29, **29**, **30**, 31, **31**, **32**
  canopies/cockpits **12**, 18, **19**, **20**, **21**, **22**, **36**
  cutting of **21**, 22, 23–4, **23**
  masks/patterns 24, **24**, 47, 49, 52
  on spinners **32**
  on walkways **39**
  protecting interiors **45**
  removal of **19**, 24, 31, **31**, **34**, **36**
  streaking and stains **37**
metalizer mixture, use of **56**, **72**, **77**
mineral spirits thinner 6, 7, **12**, 15, 16, **26**, 29, 34, 63, **63**, 64, 78

oil paints, use of **6**, 7, **14**, 15–16, **27**, **28**
  advantages of 7
  characteristics of finish 15
  mixing with enamels 31
  removal of 78
  thinning of **12**, 15, 29, 34
  tonal effects/variations 35, **39**
  'wicking' of 34, 63, **63**

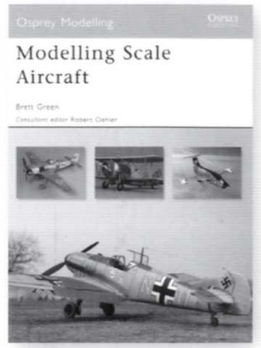
paintbrushes, use of 7, **11**, **12**, **13**, **14**, 15, 16, **17**, **19**, 24, **26**, **27**, 31, **44**, 45, 47, **48**, 49, 53, 57, **58**, **74**, **75**, **77**, 78, 79
  care and cleaning 10
  grade/quality **9**, 10, **14**, 34, 60: 00 **14**, 31; 000 15, 16, 34, **38**, 40, **44**, 45, 53, 63, 68, 78; No. 4 54, 57, **58**, 63, **63**, **67**
  uses for old ones 10, **10**
  use for weathering **17**, **26**, 29, 34, **35**, **36**, **38**, 40, 44, **48**, 49, 54, **55**, **56**, 57, **57**, **58**, **59**, **62**, 63, **63**, 64, **64**, **65**, 66, **67**, 68, **68**, 69, **69**
pencil lead/pencils, use of 56, **70**, **72**
pigment powders, use of 7, 10, 54, 63, 66, 68, **70**, **72**
primer, use of 6, **8**, 11, **12**, 20, 22, 27, 31, **43**, 44, 45, 53, 78
  decanting of 6, **8**, **9**, 20, **43**

SdKfz 234/4 Panzerspähwagen 5, **43**, **44**, **47**, 48, 49–50, **50**, **51**, 52, **52**, **61**, **64**, **67**, **68**, **71**, **72**
Sherman tank 5, **43**, **46**, **48**, 49, **53**, **54**, 57, **60**, **63**, **69**, **70**, **71**, **73**, 78
Solvaset decal setting solution **33**, 34, 60
stowage items 52, **52**, 53, 53, 68

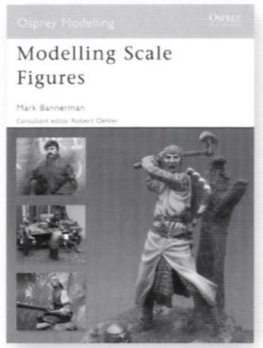
T-34/76 Mod. 1941 tank 5, 44, **45**, **47**, **49**, **52**, **55**, **56**, **62**, **63**, **65**, **66**, **79**
tools and accessories 52, **52**, 53, **60**, 64, **65**, **71**, **72**
toothpicks, use of 10, **19**, 20, **20**
track lengths/links/pads/runs 44, 45, **46**, 53–4, **53**, **54**, **55**, **56**, 57
transfers (dry rub-on), use of 59–60
tweezers, use of **19**, 31, 34

weathering 4–5, 34–5, **35**, 38, **38**, **43**, 44, 45, **45**, 52, 59, 61–2, **71**
  batteries **45**
  cannon/gun-firing stains 40, **41**
  chipped/scratched paint 16, 38, **38**, 40, **41**, **42**, 62, **62**, **67**, 68–9, **69**, **70**, **72**
  control surfaces **38**, **42**, **44**
  cockpits **12**, **13**, **14**, 16, 40
  corrosion and rain streaks 63, **63**
  dirt/dust/mud 4–5, 7, 9, **35**, **36**, 45, **47**, 53, **53**, 57, **57**, **58**, 59, 61–2, **61**, 66, **66**, **67**, 68, **68**, **71**
  engines/engine decks 16, **16**, 35, 40, 47, **69**
  exhaust pipes/silencers 16, **16**, **18**, 62–3, **62**
  exhaust stains 35, **35**, **36**, 38, **41**
  fading/smearing/streaking 27, **27**, **28**, 29, 34, 35, **37**, **48**, 49, 63, **63**
  grease-staining 57, 59, **59**
  gun barrels 64, **72**
  hatches and turrets 64, 68, **70**
  heat effect/scorching 62, **62**, 62
  oil/fluid leaks and stains **17**, 35, **69**
  oil-paint washes 7, **13**, 15–16, **26**, 33, 34, **44**, 54, 63–4, **63**, **64**
  panel lines **22**, **23**, **26**, 34, **37**, **38**, **41**
  pre-shading **11**, 20, **21**, 22, **22**, 23, **23**, 24, **24**, **26**, 34, 44, 45, **46**, **49**
  rust, depiction of 4–5, 7, 57, 63
  scratch/scuff marks 16, 38, **38**, **44**, 45
  wheels/tyres 31, **32**, **36**, **47**, **56**, 57, **57**, **58**, 59, **59**
  worn metal 16, **72**

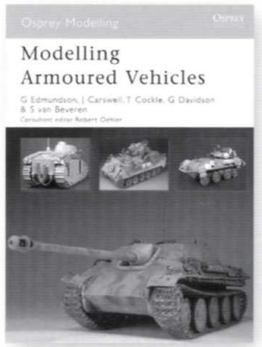
RELATED TITLES



MOD 041 • 978 1 84603 237 0

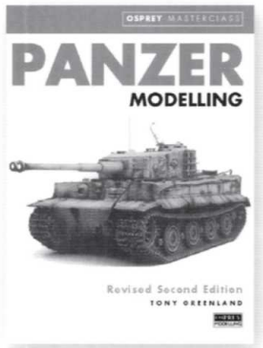


MOD 042 • 978 1 84603 238 7

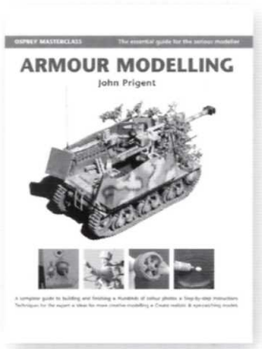


MOD 043 • 978 1 84603 287 5

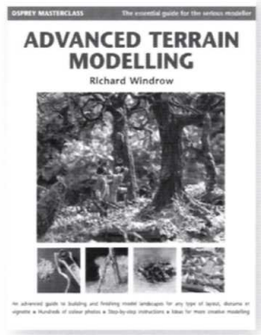
MOD 044 • 978 1 84603 416 9



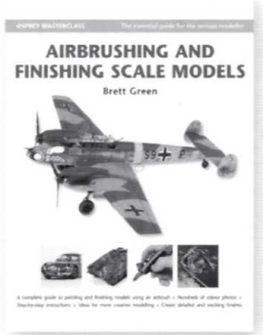
MST • 978 1 84176 236 4



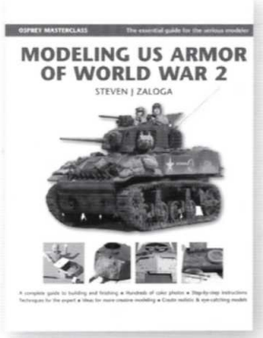
MST • 978 1 84176 974 5



MST • 978 1 84176 975 2



MST • 978 1 84603 199 1



MST • 978 1 84603 398 8

VISIT THE OSPREY WEBSITE

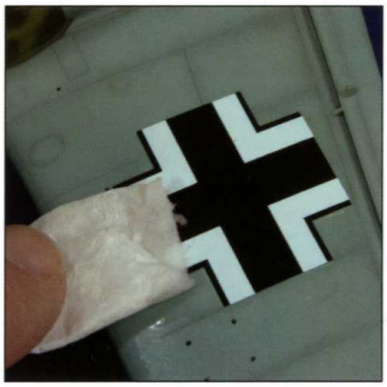
Information about forthcoming books • Author information • Read extracts and see sample pages • Sign up for our free newsletters • Competitions and prizes • Osprey blog

www.ospreypublishing.com

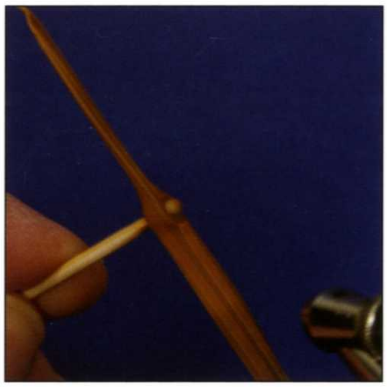
To order any of these titles, or for more information on Osprey Publishing, contact:

North America: uscustomerservice@ospreypublishing.com
UK & Rest of World: customerservice@ospreypublishing.com

Expert advice on how to get the most from your modelling.



Unrivalled detail



Full colour reference

Useful tips and techniques

Creative approaches to modelling

Painting and Finishing Techniques

Although many modellers can master the basic techniques of construction, it is with the painting and finishing of their kits that many begin to struggle. It is these skills that give the model its distinctive look and feel, and separate the truly great model from the good one. Aimed at both the beginner and the intermediate modeller, this title presents a detailed, step-by-step approach to addressing the difficulties involved in creating realistic, colourful finishes to armour and aviation models using a variety of different styles and techniques.

US $19.95 UK £13.99
CAN $22.95
ISBN 978-1-84603-263-9

OSPREY
PUBLISHING

www.ospreypublishing.com